

**WATERSHED LAND TRUST, INC. IN-LIEU FEE PROGRAM
COWSKIN CREEK STREAM AND WETLAND
MITIGATION PLAN
Sedgwick County, Kansas
(NWK-2015-00570)**



Submitted to:

**U.S. Army Corps of Engineers
Kansas City District Office**

Submitted by:

Watershed Land Trust, Inc.

Missouri Office
140 Cherry Hill Dr.
Belton, MO 64012

Kansas Corporate Office
7211 W. 98th Terr., Ste. 140
Overland Park, KS

Kansas Field Office
1200 SW Executive Dr.
Topeka, KS 66615

July 2015

TABLE OF CONTENTS

INTRODUCTION	1
OBJECTIVES	4
SITE SELECTION	6
SITE PROTECTION INSTRUMENT	18
BASELINE INFORMATION	19
DETERMINATION OF CREDITS.....	26
MITIGATION WORK PLAN	38
OPERATION AND MAINTENANCE PLAN	43
PERFORMANCE STANDARDS	46
MONITORING REQUIREMENTS	48
LONG-TERM MANAGEMENT PLAN.....	48
ADAPTIVE MANAGEMENT PLAN	51
FINANCIAL ASSURANCES	51
REFERENCES	52

FIGURES

Figure 1: WLT ILF Program Mitigation Site Location	3
Figure 2: WLT ILF Program Mitigation Site Layout	4
Figure 3: HUC 11030013 Watershed Boundary.....	7
Figure 4: WLT ILF Program Cowskin Creek Stream and Wetland Mitigation Service Area	8
Figure 5: USGS Topographic Map –WLT ILF Program North Tract.....	9
Figure 6: USGS Topographic Map –WLT ILF Program South Tract.....	10
Figure 7: WLT ILF Program North and South Tract FEMA Flood Map	11
Figure 8: NRCS Soils Map – WLT ILF Program North Tract	12
Figure 9: NRCS Soils Map – WLT ILF Program South Tract	13
Figure 10: WLT ILF program North and South Tract National Wetlands Inventory	14
Figure 11: North Property Westar Energy, Inc. Easement	25
Figure 12: South Property Westar Energy, Inc. Easement	26
Figure 13: Cowskin Creek Stream Mitigation Reaches.....	30
Figure 14: WLT ILF Program North Tract Mitigation Regions.....	39
Figure 15: WLT ILF Program North Tract Mitigation Regions	40

TABLES

Table 1: Ohio Rapid Assessment Method for Wetlands Version 5.0 Category Summary.....	21
Table 2: Baseline Wetland ORAM Scores	22
Table 3: Kansas FQA Wetland Indicator Status Coefficients	23
Table 4: Wetland Indicator score for observed vegetative species.....	23
Table 5: Proposed Wetland Credit Amounts	27
Table 6: WLT ILF Program Middle Arkansas Service Area Wetland Projects	27

TABLES (continued)

Table 7: WLT ILF Cowskin Creek Project Reaches	28
Table 8: KSMG In-Stream Work/Channel Restoration or Enhancement and Relocation Worksheet.....	33
Table 9: Proposed KSMG Riparian Buffer Credits	36
Table 10: WLT ILF Program Middle Arkansas Service Areas Stream Projects	36
Table 11: Canopy Cover per Mitigation Region.....	41
Table 12: Proposed Native Grass and Forb Seed Mixture.....	43
Table 13: Targeted Noxious or Invasive Vegetative Species	45
Table 14: Long-Term Maintenance Schedule (Based on 2015 Prices)	50

APPENDICIES

- A: Cowskin Creek Preliminary Stream and Wetland Mitigation Design
- B: Norman Ecological Consulting Wetland and Plant Community Report
- C: ORAM Worksheets
- D: Fluvial Geomorphology Report

July 2015

INTRODUCTION

On April 10, 2008, the U.S. Army Corp of Engineers (USACE) and the U.S. Environmental Protection Agency (USEPA) issued regulations governing compensatory mitigation for activities authorized by permits issued by the Department of the Army (DA) (Federal Register, Vol. 73. No. 70, pp 19594-19705). These regulations (Final Rule) establish performance standards and criteria for the use of permittee-responsible compensatory mitigation, mitigation banks, and in-lieu fee (ILF) programs to implement compensatory projects for activities authorized by USACE permits. Watershed Land Trust, Inc. (WLT) is a 501(c)(3) non-profit natural resources management company, and a USACE approved, Kansas statewide ILF provider. WLT ILF program's fundamental purpose is to provide compensatory mitigation to offset aquatic resource impacts resulting from unavoidable losses to waters of the United States (WOUS) authorized by USACE permits (WLT 2013). Specifically, the WLT ILF program will utilize restoration, establishment, enhancement, and/or preservation techniques of aquatic resources through funds paid to an approved natural resource management entity or to a government body by a USACE permit recipient in order to satisfy compensatory mitigation requirements.

WLT formed to hold land in fee simple and/or conservation easements in perpetuity. Most land trusts seek to hold large areas of distinctive terrestrial landscapes. WLT is unique in that its mission and focus is to preserve watersheds and their associated aquatic resources. While WLT provides required financial and legal expertise for the ILF program, the Watershed Institute, Inc. (TWI) provides technical expertise for implementation and monitoring of compensatory mitigation. TWI incorporated as a not-for-profit company in 2004, whose staff provides a multidisciplinary approach to natural resource management.

To mitigate existing ILF projects and anticipated mitigation needs, WLT completed a yearlong search and acquisition of a 228-acre site, comprised of two tracts near Maize, Kansas. Prior to property acquisition, WLT consulted USACE and the Kansas Interagency Review Team (IRT) in an April 8, 2014 conference call. Conference call participants included Darin Banks (USEPA), David Bender (Kansas Department of Wildlife, Parks, and Tourism [KDWPT]), Doug Berka (USACE), Susan Blackford (U.S. Fish and Wildlife Service [USFWS]), Luke Cory (USACE), and Jason Daniels (USEPA); WLT personnel Frank Austenfeld, and TWI personnel Brock Emmert,

and Kirk Mammoliti. Kansas IRT members unanimously approved the purchase stating the proposed mitigation site was suitable for WLT's ILF program as the site possessed important ecological resources that were locally valuable due to its proximity to Wichita's urban expansion. In addition, Mr. Bender added that the site contained necessary suitable habitat for the Eastern spotted skunk (*Spilogale putorius*), a Kansas-listed and federally proposed Threatened species. Once approved, TWI purchased the property. WLT will hold the conservation easement providing the required site protection. WLT completed purchase and transfer of title of the property in July 2014.

TWI has identified a mitigation strategy and extent of land to preserve through a conservation easement. WLT's ILF program stream and wetland mitigation plan will provide information on the mitigation strategy as outlined in *In-Lieu Fee Program Instrument Outline for Proposed In-Lieu Fee Programs in the States of Kansas and Missouri* (USACE 2010a).

WLT's ILF program mitigation site consists of two tracts (identified in this mitigation plan as North Tract and South Tract, based on geographic position). The North Tract is approximately 111-acres in size and is located in Section 26, Township 26 South, Range 2 West. The approximate center of the North Tract is 37.756455 degrees north latitude and 97.506640 degrees west longitude. The South Tract is approximately 117-acres in size and is located in Section 36, Township 26 South, Range 2 West. The approximate center of the South Tract is 37.74377 degrees north latitude and 97.494384 degrees west longitude. The site is located approximately 2.5 miles southwest of Maize, Kansas (see Figure 1).

The North Tract is 0.50 mile northwest of the West (W.) 37th Street North (N.) and N. 135th Street W. intersection (see Figure 2). The South Tract is 0.60 mile southeast of the W. 37th Street North and N. 135th Street W. intersection (see Figure 2). The North Tract is bordered to the north by agricultural cropland; to the east by N. 135th Street W., a City of Wichita high-pressure sewage treatment plant, and mitigation conservation easement property; to the south by agricultural cropland and W. 37th Street N.; and to the west by agricultural cropland and farmstead. The South Tract is bordered to the north by the City of Wichita high-pressure sewage treatment plant and conservation easement mitigation property; to the east by agricultural cropland and a Maize residential neighborhood; to the south by agricultural cropland and W. 29th Street N.; and to the

west by agricultural cropland and N. 135th Street W. The site is located along Cowskin Creek, a tributary to the Arkansas River.

Figure 1: WLT ILF Program Mitigation Site Location

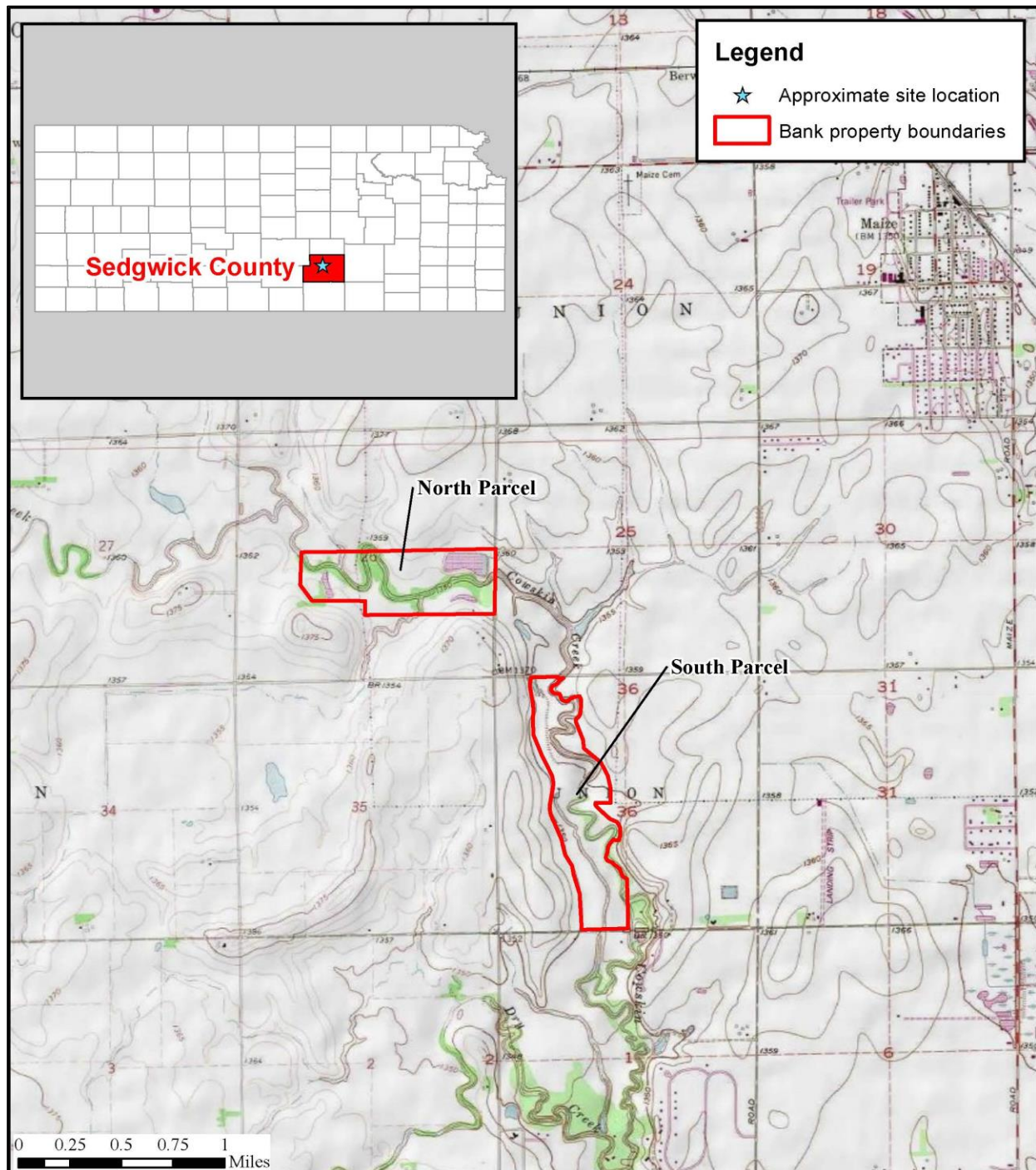


Figure 2: WLT ILF Program Mitigation Site Layout



OBJECTIVES

The Cowskin Creek mitigation tracts have existing stream and wetland impairments that WLT intends to address through enhancement and restoration mitigation activities. In the north tract, 6,190-feet of Cowskin Creek, a fourth-order perennial stream, flows through the property transitioning from a Rosgen E6 to C6c-/B6c stream type. In-channel impairments include numerous woody debris piles that occupy a large portion of the bankfull channel area, a low-water culvert crossing, and backwater from a downstream low-water dam. Much of the riparian corridor is Osage orange (*Maclura pomifera*) and Honey locust (*Gleditsia triacanthos*) and these species

are expanding further into the floodplain, a departure from the historic mixed tall and midgrass prairies (Natural Resource Conservation Service [NRCS] 2008). There is also 729-feet of an unnamed tributary to Cowskin Creek that enters the north tract and joins Cowskin Creek. This second-order intermittent stream classifies as a Rosgen E6/C6 stream type. Tributary impairments include a perched culvert crossing and excessive streambank erosion along the right (east) streambank.

North tract floodplain/wetland impairments include a series of constructed levees that reduce floodplain connectivity and alters wetland hydrology. Woody species (Osage orange and honey locust) encroachment are also affecting wetland hydrology in these areas. Finally, there are constructed drainage swales the drain overland flow and flood flows from the floodplain and wetlands altering wetland hydrology.

In the south tract, 8,922-feet of Cowskin Creek flow through the property. Cowskin Creek in the south tract remains a fourth-order perennial stream and is a Rosgen C6c-/B6c stream type. 7,424-feet of Cowskin Creek is within the backwater pool of an old lowhead dam. Other stream impairments include several large woody debris jams that occupy a large portion of the bankfull channel, and areas of accelerated streambank erosion. Similar to the north tract, the south tract riparian corridor consists of Osage orange and honey locust, a departure from historic plant communities.

South tract floodplain/wetland impairments include a series of constructed levees that reduce floodplain connectivity. Previously, owners converted about 28-acres of floodplain into cultivated land. The cultivated land has a large swale that drains the land to the south. Finally, woody species encroachment occurs in wetlands negatively affecting hydrology and wetland plant species.

WLT's objectives are to provide applicable compensatory mitigation through WLT's ILF program for adverse impacts to WOUS as described in Section 404 of the Clean Water Act, and to restore historical natural resource benefits to the service area by improving the current state of stream and wetland habitats. WLT's proposed mitigation activities will achieve these objectives by:

- Restoring 62.14-acres of Riparian Buffer
- Rehabilitating 100.34-acres of Emergent Wetlands

- Reestablishing 20.12-acres of Emergent Wetlands
- Restoring 28.16-acres of Upland Buffers
- Increasing streambank stability along 15,112 linear feet of Cowskin Creek
- Removing a lowhead dam, perched culvert crossing, low water culvert crossing, and large woody debris blockages within 15,112 linear feet of Cowskin Creek and 729 linear feet of an unnamed Cowskin Creek tributary.
- Removing constructed levees to restore natural floodplain connectivity
- Constructing a rock riffle letdown structure on Cowskin Creek (upstream of current low-head dam) that will provide aquatic organism passage

Completed mitigation activities will result in functioning natural resources through removal of invasive woody and herbaceous vegetation species, reconnection of natural resources to the local aquifer and historical floodplain, and in-stream channel and habitat improvements. TWI will remove several in-stream impediments (i.e. large woody debris and low water crossings) to promote aquatic species passage. TWI has developed design drawings to show the specific mitigation activities (see Appendix A). Targeted streambank stabilizations and riparian and wetland buffer restoration activities will increase streambank stability and reduce Cowskin Creek sedimentation and improve water quality by filtering nutrients from agricultural runoff. For wetlands, TWI mitigation activities include reestablishing and rehabilitating temporarily and seasonally flooded emergent wetlands that are common along the Cowskin Creek floodplain.

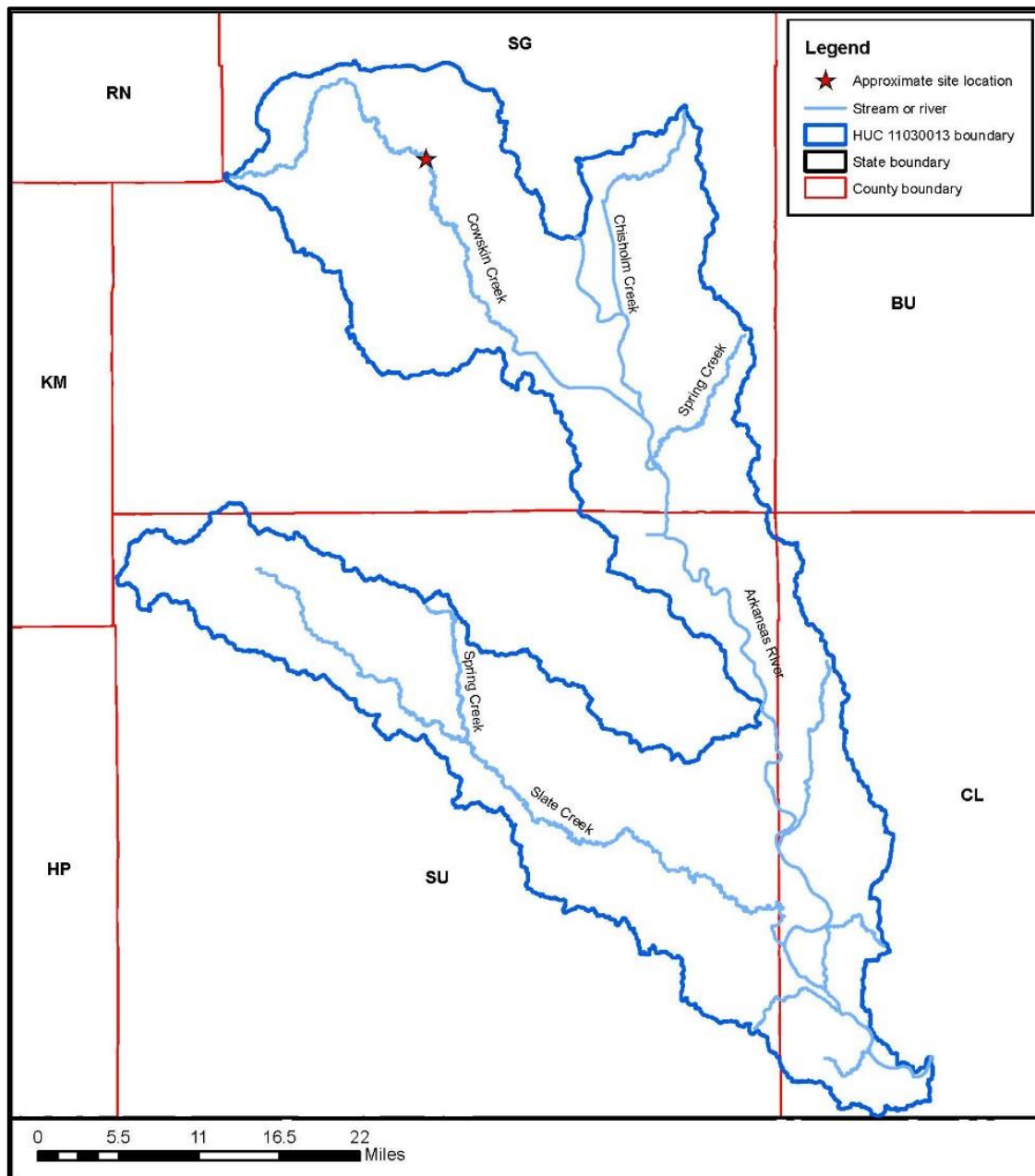
The listed stream and wetland mitigation activities will help address Cowskin Creek water quality needs, a 303(d) listed stream, and protect stream and wetland resources in a rapidly urbanizing watershed. Middle Arkansas service area resource concerns identified through established Watershed Restoration and Protection Strategies programs (WRAPS) are establishing and maintaining native riparian buffers, created and/or restoring wetland habitats and playa lakes, and protecting existing wetlands and playa lakes (River City WRAPS 2012). Proposed WLT mitigation activities will address these service area needs.

SITE SELECTION

The mitigation project site is located along Cowskin Creek (perennial WOUS), a tributary to the Arkansas River. At the mitigation project site's downstream extent, Cowskin Creek is fourth order

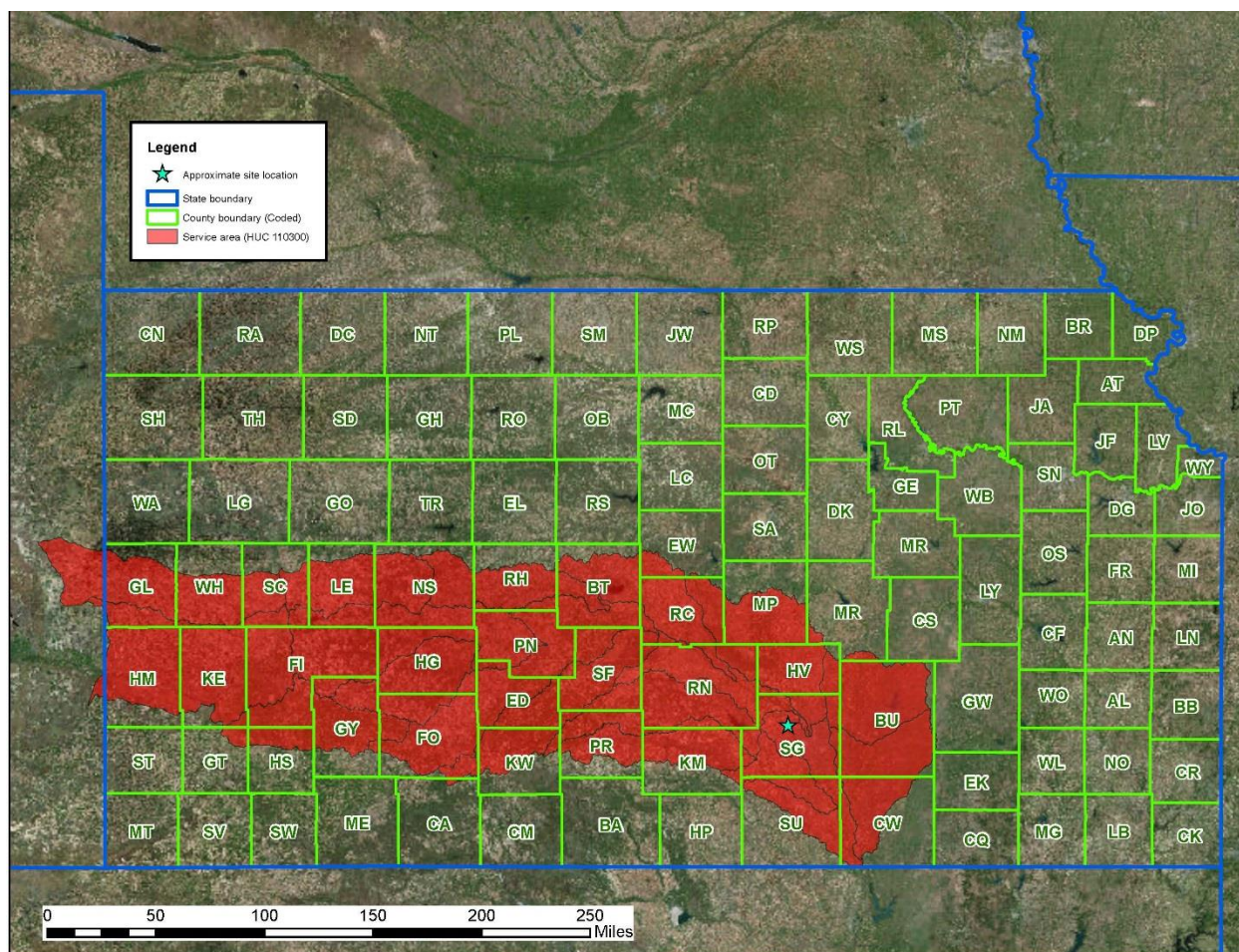
stream and has a drainage area of 55.7 square miles. Cowskin Creek originates in western Sedgwick County, Kansas and flows about 48 miles southeast to the confluence with the Wichita Valley Center Floodway channel in Wichita, Kansas. The site is located within the 11030013 Middle Arkansas-Slate Hydrologic Unit Code (HUC) 8 watershed (see Figure 3). Major streams within this watershed are Arkansas River, Chisholm Creek, Spring Creek, Slate Creek, and Cowskin Creek.

Figure 3: HUC 11030013 Watershed Boundary



As described in the WLT ILF Instrument, the ILF program serves the entire state of Kansas; however, the Kansas City District USACE and the Kansas IRT determined that the USGS HUCs are the appropriate basis to develop service area boundaries. The WLT ILF Instrument identifies 11 unique service areas within the state of Kansas, including the Middle Arkansas HUC 6 (110300) (WLT 2013). Figure 4 shows the boundaries of the Middle Arkansas service area.

Figure 4: WLT ILF Program Cowskin Creek Stream and Wetland Mitigation Service Area



The WLT ILF Program mitigation project site is ecologically suitable for large-scale wetland and stream mitigation due to its abundance of existing and potential natural resources, its position along Cowskin Creek, topography, hydrology, and soils. Mitigation within the Arkansas River watershed is encouraged because this waterway qualifies as a primary priority area under the Kansas Stream Mitigation Guidance (KSMG) (Mulder et al 2010). KSMG primary priority areas are defined as streams and riverine systems (including associated tributaries) that provide very

important contributions to biodiversity on an ecosystem scale or high levels of function contributing to landscape, social, economic or human values (Mulder et al. 2010). The Kansas Department of Health and Environment (KDHE) determined the Arkansas River to be a primary priority area because and classified it as an Exceptional State Water within Sedgwick County (KDHE 2007).

Using light detection and ranging (LiDAR)-derived elevation data obtained from the Sedgwick County Geographic Information Systems (GIS) department, the elevations on the North Tract range from 1,347 (at Cowskin Creek) to 1,368 (at the northern boundary) feet above mean sea level (amsl). South Tract elevations range from 1,341 (at Cowskin Creek) to 1,358 (at the eastern boundary) feet amsl. Generally, elevations at the site show little relief in areas adjacent to Cowskin Creek. Upland areas and constructed berms/levees appear in LiDAR data as obstructions to the natural floodplain. In addition, the most recent U.S. Geological Survey (USGS) topographic maps show that the site is situated along Cowskin Creek with elevations near or slightly above 1,350 feet amsl (USGS 1982a-c) (see Figures 5 and 6).

Figure 5: USGS Topographic Map –WLT ILF Program North Tract

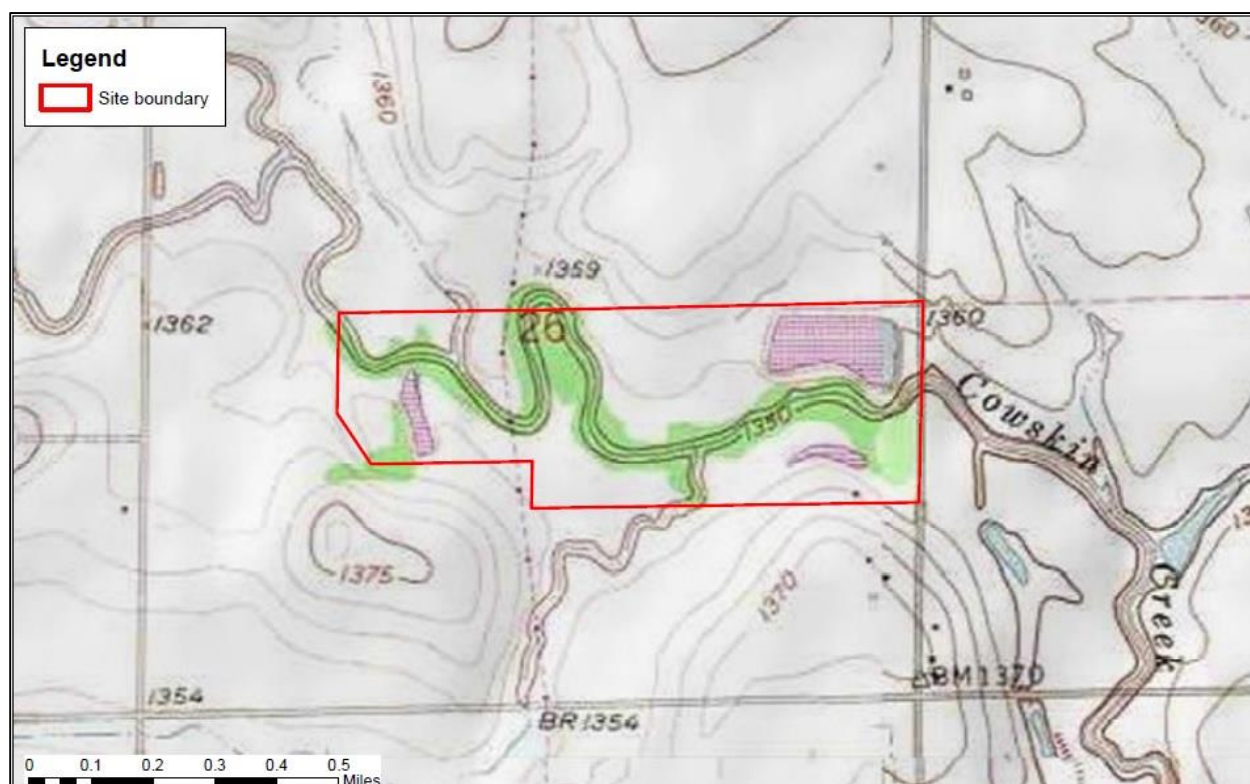
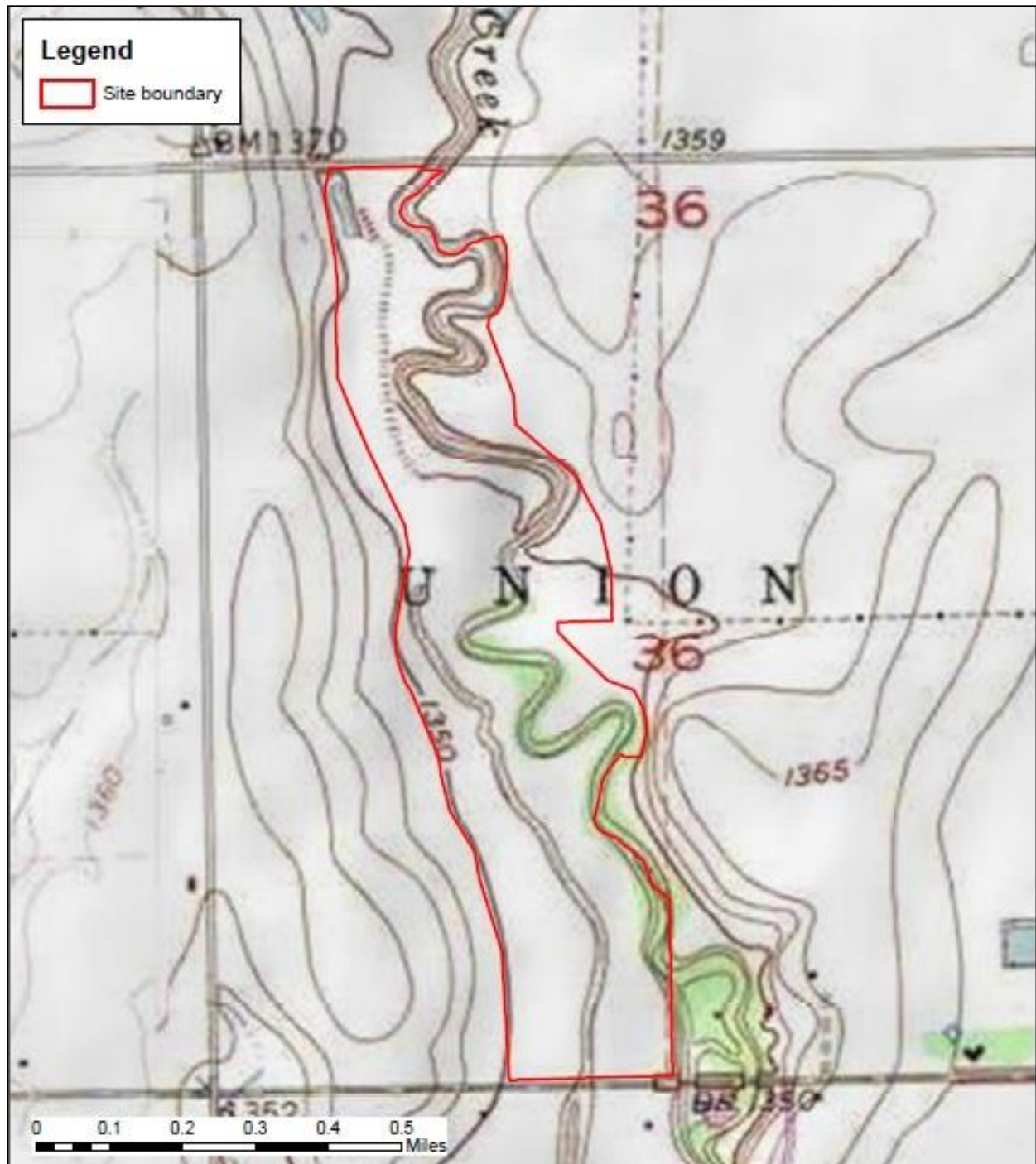
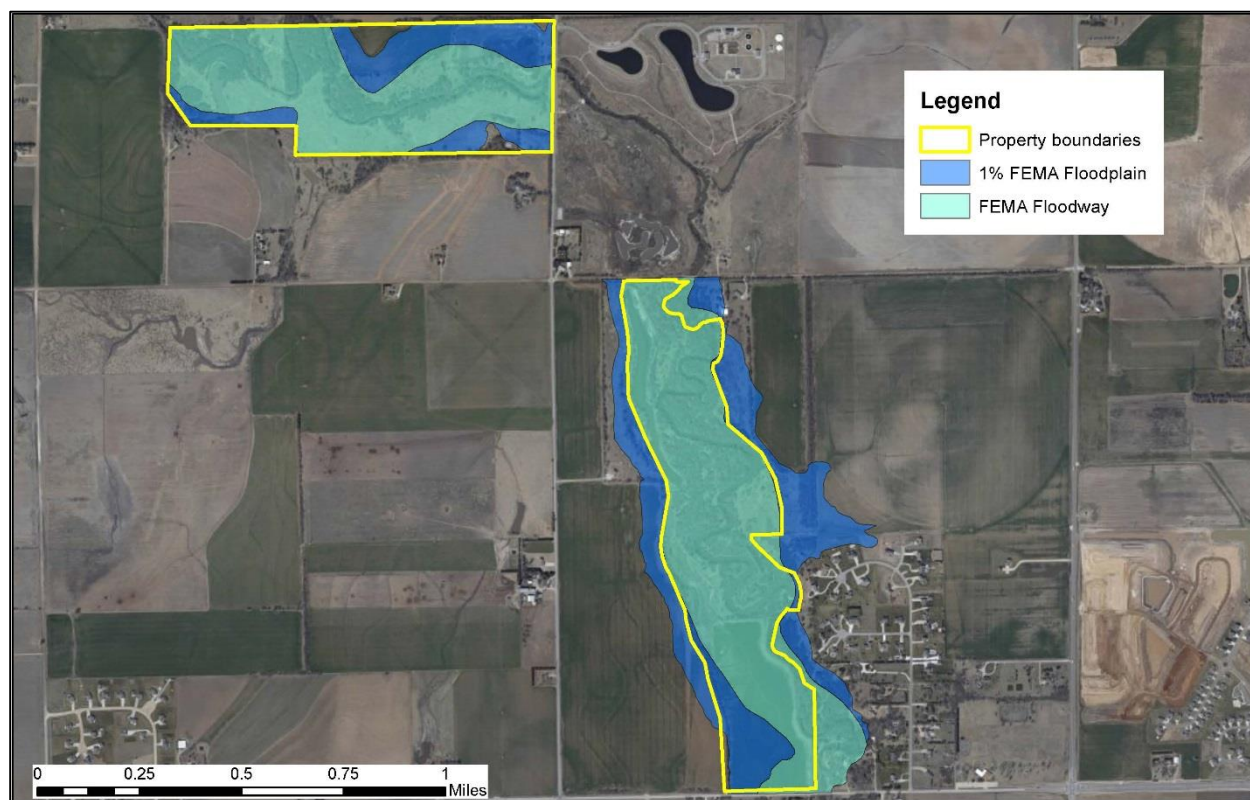


Figure 6: USGS Topographic Map – WLT ILF Program South Tract



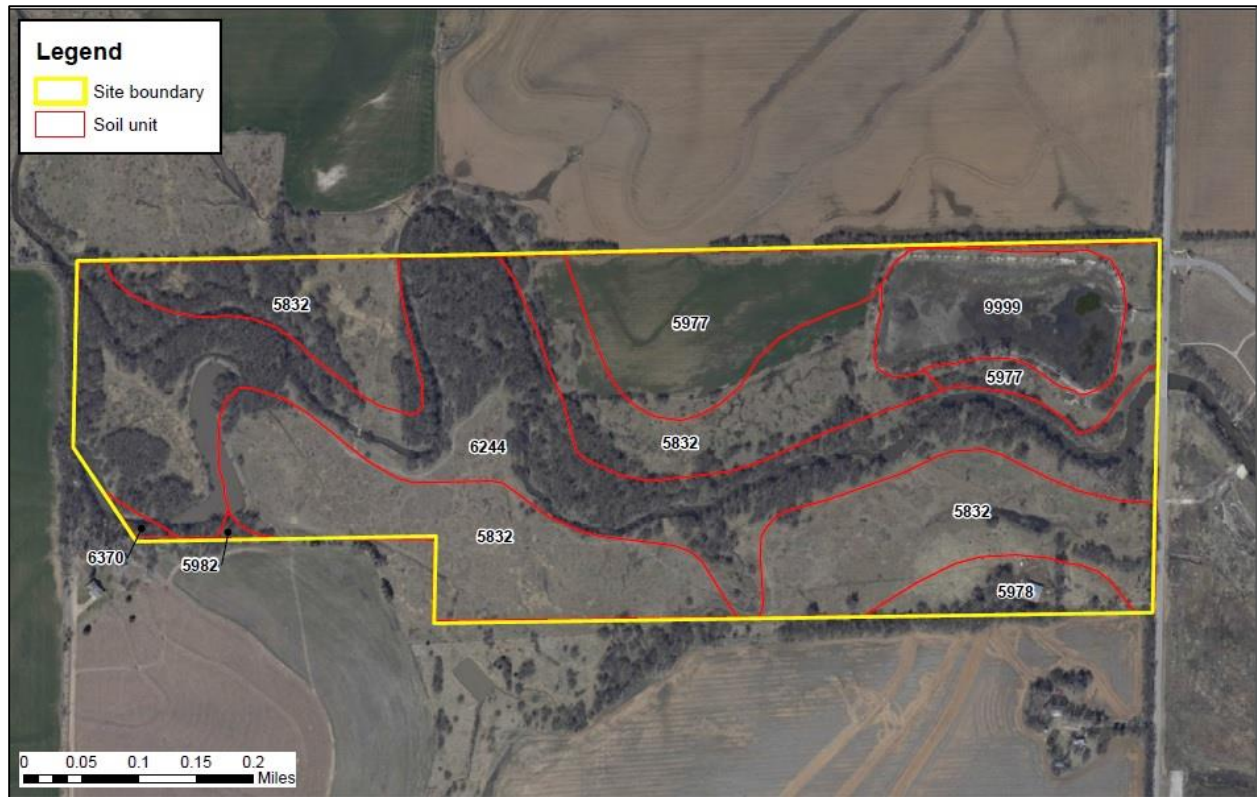
Portions of the site are subject to occasional flooding from Cowskin Creek. Figure 7 depicts the Federal Emergency Management Agency (FEMA) floodway and 1% annual chance (on a 100-year floodplain) boundaries at the site.

Figure 7: WLT ILF Program North and South Tract FEMA Flood Map



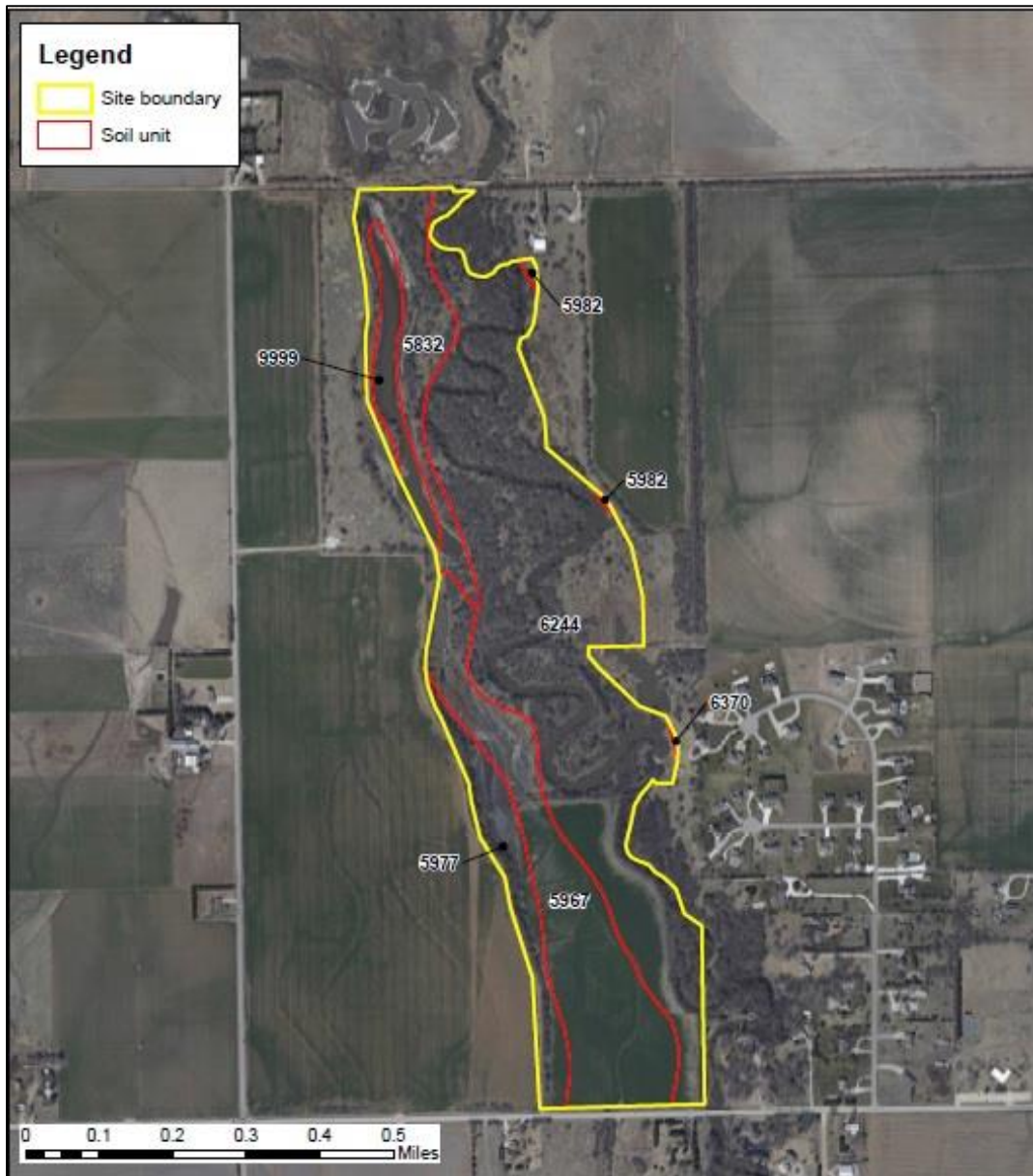
Soils include Punkin-Taver complex, Tabler silty clay loam, Vanoss silt loam, Nalim loam, Elandco silt loam, and Milan loam (see Figures 8 and 9). NRCS states that these soils are rarely or never flooded; however, NRCS lists these soils as having hydric soil inclusions (NRCS 2014). NRCS (2014) lists hydric soil components are found in depressions, drainageways, and hillslopes for Tabler silty clay loam, Vanoss silt loam, Elandco silt loam, and Milan loam soils. For Punkin-Taver complex soils, NRCS (2014) lists hydric soils are found in Kisiwa soils, a minor soil component found in floodplains and terraces. For Nalim loam, NRCS (2014) lists hydric soils are found in Carbika soils, a minor soil component found in depressions.

Figure 8: NRCS Soils Map – WLT ILF Program North Tract



Map Unit Symbol	Map Unit Name	Slope
5832	Punkin-Taver Complex	0 to 1 %
5977	Vanoss silt loam	1 to 3 %
5978	Vanoss silt loam	3 to 7 %
5982	Nalim loam	1 to 3 %
6244	Elandco silt loam, rarely flooded	0 to 1 %
6370	Milan loam	3 to 6 %
9999	Water	N/A

Figure 9: NRCS Soils Map – WLT ILF Program South Tract



Map Unit Symbol	Map Unit Name	Slope
5832	Punkin-Taver Complex	0 to 1 %
5967	Tabler silty clay loam	0 to 1 %
5977	Vanoss silt loam	1 to 3 %
5982	Nalim loam	1 to 3 %
6244	Elandco silt loam, rarely flooded	0 to 1 %
6370	Milan loam	3 to 6 %
9999	Water	N/A

USFWS National Wetlands Inventory (NWI) identified three palustrine wetland types including PEMC (seasonally flooded emergent wetland), PABFh (semipermanently flooded and impounded, aquatic bed wetland), and PABFx (semipermanently flooded and excavated, aquatic bed wetland) on the North Tract. On the South Tract, the NWI identified four palustrine wetland types including PABFh, PEMA (temporarily flooded emergent wetland), PEMFh (semipermanently flooded and impounded emergent wetland), and PSSA (temporarily flooded scrub-shrub wetland) (USFWS 2014). Figure 10 below shows these wetlands as mapped by NWI.

Figure 10: WLT ILF program North and South Tract National Wetlands Inventory



The Middle Arkansas-Slate (11030013) sub-basin is a watershed identified by KDHE and NRCS to be in need of restoration. Of the 92 HUC 8 watersheds in Kansas, KDHE and NRCS (1998) ranked the Middle Arkansas-Slate watershed as the 6th highest priority for restoration (KDHE & NRCS 1998). Additionally, KDHE and NRCS (1998) ranked the adjacent North Fork Ninnescah (11030014), Little Arkansas (11030012), Gar-Peace (11030010), and Lower Walnut River (10030018) as 7th, 14th, 19th, and 42nd priority watersheds, respectively.

KDHE (2014) has identified and prioritized four water quality impairments for the Middle Arkansas-Slate sub-basin, and include bacteria (FCB), excess nutrients, sedimentation, and pollutants associated with sedimentation (pesticides, fertilizers, and metals), prioritized respectively. Specifically, KDHE (2007 and 2000a) has established high implementation priority total maximum daily loads (TMDL) for Cowskin Creek that include biological and bacteria. KDHE lists Cowskin Creek on the State of Kansas 2014 Clean Water Act Section 303(d) List of all Impaired/Potentially Impaired Waters. This list includes Cowskin Creek at Wichita, near Belle Plaine, and in the Wichita-Valley Center Floodway as having its aquatic life threatened by impaired biology and total phosphorus, and its recreational value threatened by *E. coli* (KDHE 2014). Within the Middle Arkansas-Slate sub-basin, primary pollutants of concern include fecal coliform bacteria (FCB) (27% of waters impaired), chlordane (23% of waters impaired), excess nutrients (19% of waters impaired), chloride (15% of waters impaired), and sulfate (15% of waters impaired) (KDHE 2000b). In addition, excess siltation within the waters of Middle Arkansas-Slate sub-basin is a source of eutrophication (due to nutrient loading) and results in poor turbidity. Overall, groundwater resources in the Middle Arkansas-Slate sub-basin (including Arkansas River alluvial aquifers and the High Plains aquifer) are in good condition with only naturally occurring levels of minerals being the primary pollutants of concern (KDHE 2000b).

River City Watershed Restoration and Protection Strategy (WRAPS) developed a Nine Element Watershed Plan that includes the Cowskin Creek watershed. Priority goals for these WRAPS plans address biological and bacteria impairments to streams. In addition, the WRAPS plan places high priority on atrazine, dissolved oxygen, total suspended solids, and total phosphorus (Kansas Center for Agricultural Resources and the Environment & Kansas State University Research and Extension, 2011).

Land use within the Middle Arkansas-Slate sub-basin is primarily comprised of grassland (73.4%), row crop (12.3%), and urban development (11.5%). Wichita and surrounding development plays a significant role in point source pollution from wastewater treatment facility and lagoon discharges and non-point source pollution through runoff from impervious surfaces (River City WRAPS 2012). However, KDHE (2000b) states the majority of the water quality issues associated with the Middle Arkansas-Slate sub-basin is from non-point pollution sources including feedlots, rangeland livestock, and septic tanks. The proposed mitigation activities will improve water quality inputs to Cowskin Creek and the alluvial aquifer through reduction in sediment runoff and riparian and wetland buffer filtration. These planned improvements to Cowskin Creek and its adjacent wetlands will be a great improvement to land management practices within a watershed dominated by agricultural.

KDWPT considers the Middle Arkansas-Slate (11030013) sub-basin to be in good overall aquatic health (KDWPT 2006). KDWPT has three aquatic sampling sites on Cowskin Creek, including one upstream and two downstream from the site. Based on one sampling event at the upstream Site 10 (sampling event 102-LARB-01), KDWPT determined the macroinvertebrate biotic index (MBI) to be 5.35, indicating moderate impacts from nutrient and oxygen demanding pollutants (KDWPT 2006). Index for Biological Integrity (IBI) scores for sampled fish at Site 10 indicates fair stability in the fish community (KDWPT 2006). KDWPT determined Site 3 (nearest downstream) MBI values to be 5.36, 5.91, and 6.18 (for sampling events 038-LARB-99, 071-LARB-00, and 111-LARB-01, respectively), indicating impacts from nutrient and oxygen demanding pollutants to range from moderate to highly impacted. All sampling events from Site 3 yielded good stability ratings for the fish community (KDWPT 2006). For sampling event 131-LARB-01 at Site 12 (furthest downstream), KDWPT calculated an MBI value of 5.08, indicating the Cowskin Creek sampling reach to be moderately impacted by nutrient and oxygen demanding pollutants. KDWPT (2006) determined fish communities at Site 12 to have good stability. Overall, KDWPT (2006) found MBI values for the Middle Arkansas-Slate sub-basin indicative of a watershed highly impacted by nutrient and oxygen demanding pollutants; however, IBI metrics revealed good native fish species richness to stream width proportion.

The WLT ILF program mitigation site also contains designated critical habitat for the Kansas-listed threatened Eastern spotted skunk. The Eastern spotted skunk is a small mammal whose

population numbers have decreased significantly due to anthropogenic impacts to its historic habitat. Conversion of prairie to cropland, use of herbicides and pesticides, and urban development have all attributed to the decline in spotted skunk populations (Nilz and Finck 2008). KDWPT determined spotted skunk critical habitat to include, “All suitable habitats within the Cowskin Creek and Big Slough drainage basins located in Sedgwick and Sumner counties.” (KDWPT 2014). Therefore, proposed stream and wetland mitigation activities serves to protect more than the local aquatic resources.

According to the Kansas Comprehensive Wildlife Conservation Plan (CWCP), the WLT ILF program mitigation site is located within the Central Mixed Grass Prairie Region characterized by rolling plains with outcrops, breaks, and river valleys (Wasson et al 2005). Upland areas include a mixture of shortgrass and tallgrass prairie species, while river valleys and riparian areas are comprised of deciduous woodlands, shrublands, and herbaceous wetlands (Wasson et al 2005). The historic climax plant community at the site most likely consisted of tall and midgrass prairies free of trees and large shrubs (NRCS 2008). Occasional fires were an important part of the historic plant community ecological processes. With the advent of cultivated fields and roads following European settlement, the occurrence of wildfires has diminished leading to a rapid increase of shrub and tree species (NRCS 2008). In some locations, shrub and trees species have become dominant species in the plant community (NRCS 2008). NRCS (2008) also attributes shrub and tree species succession to selective grazing on grasses and forbs by domesticated livestock. Prairie habitat loss estimates for Kansas range from 80 to 90 percent (Samson and Knopf 1994). Currently, agricultural cropland, over-grazing, and climate changes continue to be the primary factors that influence conservation with the Central Mixed Grass Prairie Region (Wasson et al 2005). USFWS estimates Kansas has lost more than 400,000 acres (nearly half) of its wetlands since the late 1700s as the result of anthropogenic influences (Dahl 2014). Locally, wetlands within the site and its watershed have been impacted by cattle grazing, drainage for use as cropland, and reduction of groundwater through irrigation. In WLT’s ILF program mitigation site, TWI presumes the overwhelming presence of non-native and invasive woody plant species including Osage orange and Honey locust influence alluvial groundwater resources.

The north property contains water right 32947-00 that TWI purchased as part of the property. The water right has two authorized points of diversion (ID 5 and ID 6). Diversion ID 5 is located

1,487-feet north and 3,319-feet west of the southeast corner of section 26, township 26 south, and range 2 west (N 37.755240, W 097.510640). Diversion ID 6 is located 2,600-feet north and 945-feet west of the southeast corner of section 26, township 26 south, and range 2 west (N 37.758300, W 097.502430). Authorized quantities include an annual 24.643-acre feet industrial allocation (6.267-acre feet for ID 5 and 18.376 acre-feet for ID 6) and an annual 51-acre feet irrigation allocation (36-acre feet for ID 5 and 15-acre feet for ID 6). TWI has pumped water from both wells to maintain the water right, and TWI intends to preserve that right to protect the local alluvial aquifer.

The planned stream and wetland mitigation activities are technically feasible and the site is ecologically suitable. TWI proposes floodplain hydrology restoration by removing levees and re-establishing riparian buffers, both vital in returning the site to its historic condition. Re-establishment of native herbaceous and woody plant communities can be achieved through non-native tree removal, small herbicidal applications, and over-seeding. These practices will promote a diverse array of aquatic and wildlife habitats. Since previous owners utilized the mitigation site for cropland, livestock grazing, and hunting, it possesses great potential for stream and wetland restoration. In addition, the site contains soils, topography, and hydrology necessary for successful restoration, enhancement and establishment of aquatic and wildlife habitats. The establishment of WLT's ILF program mitigation site will address numerous historic and current service area threats to the natural resources. These threats include nutrient loading, urban runoff, invasive species succession, sediment loading, drought, poor water quality, and inadequate riparian and wetland buffers. Specifically, WLT ILF program mitigation activities will serve directly to stream and wetland losses due to land clearing and development as the city of Wichita, Kansas metropolitan area is rapidly expanding. In turn, these improvements will positively influence downstream and down-gradient natural resources.

The stream and wetlands within the mitigation project site are degraded; however, their current conditions do not leave them beyond the possibility of rehabilitation or reestablishment. By implementing proposed mitigation activities, the WLT ILF program intends to improve the watershed's natural resources by restoring stream, wetland, and riparian habitats.

The property tracts are adjacent to a City of Wichita wetland mitigation project, but remaining adjacent properties are susceptible to residential and/or commercial development from Wichita and Maize annexation.

SITE PROTECTION INSTRUMENT

Ownership of the mitigation project site will remain with TWI. However, TWI will record a conservation easement in Sedgwick County naming WLT as the grantee. WLT is responsible for preserving and protecting all WLT ILF program mitigation measures. WLT will prepare the easement using USACE's conservation easement template. In preparation for filing the conservation easement, TWI will complete a Baseline Documentation Report (BDR) that includes a property description, photographic points, and a summary of grantors' rights and restrictions. The BDR provides information on the easement property location as well as land use, topography, soils, and water and wildlife resources descriptions. WLT contact information is listed below.

Frank Austenfeld, J.D.
Executive Director
Watershed Land Trust, Inc.
140 Cherry Hill Dr.
Belton, MO 64012
913/685-4600
E-mail: frank@watershedinstitute.biz

BASELINE INFORMATION

The WLT ILF program in conjunction with USACE and Kansas IRT approval has chosen these two tracts of land to complete stream and wetland mitigation activities. TWI, with assistance from Norman Ecological Consulting (NEC) collected information on the existing vegetation, channel morphology, and wetlands. The purpose of the baseline information is to ensure TWI will meet proposed ecological performance-based standards.

Over a period of 22 days in August and September 2014, NEC with the assistance of TWI staff completed a jurisdictional WOUS and plant community assessment. NEC determined vegetation communities using a modified approach to the comprehensive determination protocol described in the *1987 Corps of Engineers Wetlands Delineation Manual*. NEC conducted the jurisdictional WOUS assessment and subsequent wetland delineation using the *1987 Corps of Engineers*

Wetland Delineation Manual and Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region (Version 2.0) (USACE 2010b). NEC's jurisdictional WOUS and vegetation community assessment is in Appendix B.

After discussions with USACE and the Kansas IRT, TWI determined that it would be most appropriate to use a portion of the mitigation site as a baseline reference for reestablishing and rehabilitating wetlands. This region (identified as the South Mosaic Region), is located in the southern portion of the north tract and contains areas of wetland mosaic (see Figure 13). Only portions of the South Mosaic Region contain wetland mosaic areas, as surface water hydrology from Cowskin Creek is not available to the entirety of its adjacent floodplain due to drainage alterations. Micro-topography within this region is highly variable with a mix of hummocks and tussocks throughout, and elevations undulating from 2 to 3 feet between uplands and depressional features. NEC identified a prevalence of hydrophytic species; however, NEC determined that not all depressional and upland landscape features possessed hydric soil indicators to classify as wetlands. Flooding events occur in this area seasonally during periods of regular precipitation, with overland flow travelling along the southern border of the South Mosaic Region and re-entering Cowskin Creek at the northeastern portion of the region. In areas where surface water hydrology is available for storage in the floodplain, herbaceous palustrine emergent wetland mosaics occur. Wetlands within the mosaic are fully functioning, high quality wetlands with no woody vegetation or non-native species encroachment.

To determine a baseline reference for wetland reestablishment or rehabilitation, TWI placed 11 transects (north to south) spaced 50 meters from one another within South Mosaic Region boundaries. TWI used wetlands that intersected these transects for the baseline assessment. Transects ranged in length from approximately 85 to 247 meters, as the boundaries of the South Mosaic Region were not uniform. In total, TWI selected 17 of 60 wetlands. To assess the quality of these wetlands and their adjacent uplands for determining a baseline reference, TWI used the *Ohio Rapid Assessment Method for Wetlands v 5.0* (ORAM) (Mack 2001) and the *1987 Corps of Engineers Wetlands Delineation Manual*. NEC collected data associated with this baseline assessment during baseline documentation, with delineated wetlands and vegetative communities being determined by sample plots as described in the Wetland and Plant Community Report in Appendix B.

NEC used the *1987 Corp of Engineers Wetlands Delineation Manual* during the jurisdictional wetland determination conducted at the site in July, August and September 2014. NEC determined the 17 baseline wetlands possess hydrophytic vegetation, hydric soils, and hydrological features that distinguished them as wetlands according to the manual. NEC used sample plots throughout the South Mosaic Region to determine the defining characteristics between upland and wetland, and wetland boundaries (see Appendix B).

Using the ORAM, TWI assessed the ecological quality and level of function of the 17 selected wetlands. This method quantifies six specific metrics of individual wetlands resulting in a score that falls within a range of three categories. These categories correspond to wetlands of low, medium, and high “quality”. Table 1 provides a summary of these categories. The metrics used to score each wetland include size, upland buffers and surrounding land use, hydrology, habitat alteration and development, special wetlands, and plant communities, interspersions, and micro-topography. Table 2 below provides a summary of scores for each of the 17 delineated wetlands. All baseline wetlands were determined to be Category 2 wetlands. A copy of scoring sheets completed for each delineated wetland are located in Appendix C.

Table 1: Ohio Rapid Assessment Method for Wetlands Version 5.0 Category Summary

Category	Category Description	Scoring Range
Category 1	Emergent, isolated wetlands dominated by cattails with little or no upland buffers often located in active agricultural fields. Typically disturbed by grazing activities, stormwater inputs, or other hydrologic modifications. Considered to be a resource that has been degraded with limited potential for restoration that are of low functionality.	0 - 34.9
Category 2 (Degraded but Restorable)	Wetlands that support moderate wildlife habitat, or hydrological or recreational functions, but which are degraded and have a reasonable potential for reestablishing lost wetland functions.	35 - 44.9
Category 2	Wetlands that support moderate wildlife habitat, or hydrological or recreational functions which are dominated by native species, but generally are without the presence of, or habitat for, rare, threatened or endangered species; and wetlands which are degraded but have a reasonable potential for reestablishing lost wetland functions. May relatively lack human disturbance and can be considered to be naturally of moderate quality.	45 - 64.9
Category 3	Wetlands that have superior habitat, or superior hydrological or recreational functions. They are typified by high levels of diversity, a high proportion of native species, and/or high functional values.	65 - 100

Table 2: Baseline Wetland ORAM Scores

Wetland ID	ORAM Score	Category
W-3	62	2
W-4	61	2
W-9	63	2
W-15	61	2
W-32	64	2
W-35	62	2
W-39	59	2
W-41	64	2
W-44	58	2
W-47	63	2
W-51	62	2
W-60	58	2
W-66	60	2
W-67	60	2
W-69	61	2
W-70	59	2
W-71	60	2

In addition, TWI utilized Freeman's (2012) modified Floristic Quality Assessment (FQA) version for Kansas to determine a mean wetland indicator status baseline for all observed vegetative species in the 17 selected wetlands. TWI determined that a composited, mean score for all wetlands would be the most appropriate approach to provide a baseline standard for reestablished and rehabilitated wetlands. TWI assigned wetland indicator coefficients for all observed native Kansas species (see Table 3). Mean wetland coefficients less than or equal to (\leq) -1.21 are indicative dominant hydrophytic vegetation (Freeman per comm 2014). In total, TWI used 12 observed vegetative species (observed at sample points 58, 75, 76, and 79) within the 17 selected wetlands; all of which are native to Sedgwick County (see Table 4). This resulted in a mean wetland indicator coefficient score of -1.58.

Table 3: Kansas FQA Wetland Indicator Status Coefficients

Wetland Indicator Status	Description	Coefficient
OBL	obligate wetland	-5
FACW+	>	-4
FACW	facultative wetland	-3
FACW-	>	-2
FAC+	>	-1
FAC	facultative (upland or wetland)	0
FAC-	>	1
FACU+	>	2
FACU	facultative upland	3
FACU-	>	4
UPL	upland	5

Table 4: Wetland Indicator score for observed vegetative species.

Scientific Name	Common Name	Native Status	CoC*	Indicator Status	W**	Physiognomy	Duration
<i>Grindelia squarrosa</i>	curly-cup gumweed	native	0	UPL	5	forb	perennial
<i>Iva annua</i>	annual sumpweed	native	0	FAC	0	forb	annual
<i>Vernonia baldwinii</i>	western ironweed	native	2	FACU	3	forb	perennial
<i>Carex gravida</i>	heavy sedge	native	4	FACW	-3	forb	perennial
<i>Carex molesta</i>	pest sedge	native	4	FACW	-3	forb	perennial
<i>Eleocharis macrostachya</i>	large-spike spike-rush	native	3	OBL	-5	forb	perennial
<i>Eleocharis palustris</i>	marsh spike-rush	native	6	OBL	-5	forb	perennial
<i>Euphorbia marginata</i>	snow-on-the-mountain	native	0	FACU	3	forb	annual
<i>Distichlis spicata</i>	inland salt grass	native	2	FACW	-3	forb	perennial
<i>Spartina pectinata</i>	prairie cord grass	native	4	FACW	-3	forb	perennial
<i>Persicaria bicornis</i>	pink smartweed	native	1	FACW	-3	forb	annual
<i>Polygonum ramosissimum</i>	bushy knotweed	native	2	OBL	-5	forb	annual

TWI staff completed a fluvial geomorphological survey of Cowskin Creek and the unnamed intermittent Cowskin Creek tributary documenting baseline conditions. The fluvial geomorphology report is in Appendix D detailing the methodology, survey, and findings.

There are several road and utility right of way easements recorded with the properties. For the south tract, there is a 30-foot roadway easement (from center of roadway) associated with West 29th St. North and West 37th St. North. WLT is not planning mitigation activities in these easements. For the north tract, there is a 30-foot right away easement (from center line of roadway) associated with North 135th St. West. WLT will not complete mitigation activities in this easement.

For both property tracts, there are 150-foot Kansas Gas and Electric Company (now Westar Energy, Inc.) easements associated with electric transmission lines (see Figures 11 and 12). The easements grant Westar Energy, Inc. the ability to clear timber, trim necessary trees for and build, maintain, alter, repair, operate, and remove transmission lines consisting of poles, wires, equipment, and fixtures. Currently, there is a transmission line running through the north tract easement, but not in the south tract easement. WLT's proposed mitigation activities will not conflict with the easement purposes described in the mitigation work plan.

Figure 11: North Tract Westar Energy, Inc. Easement

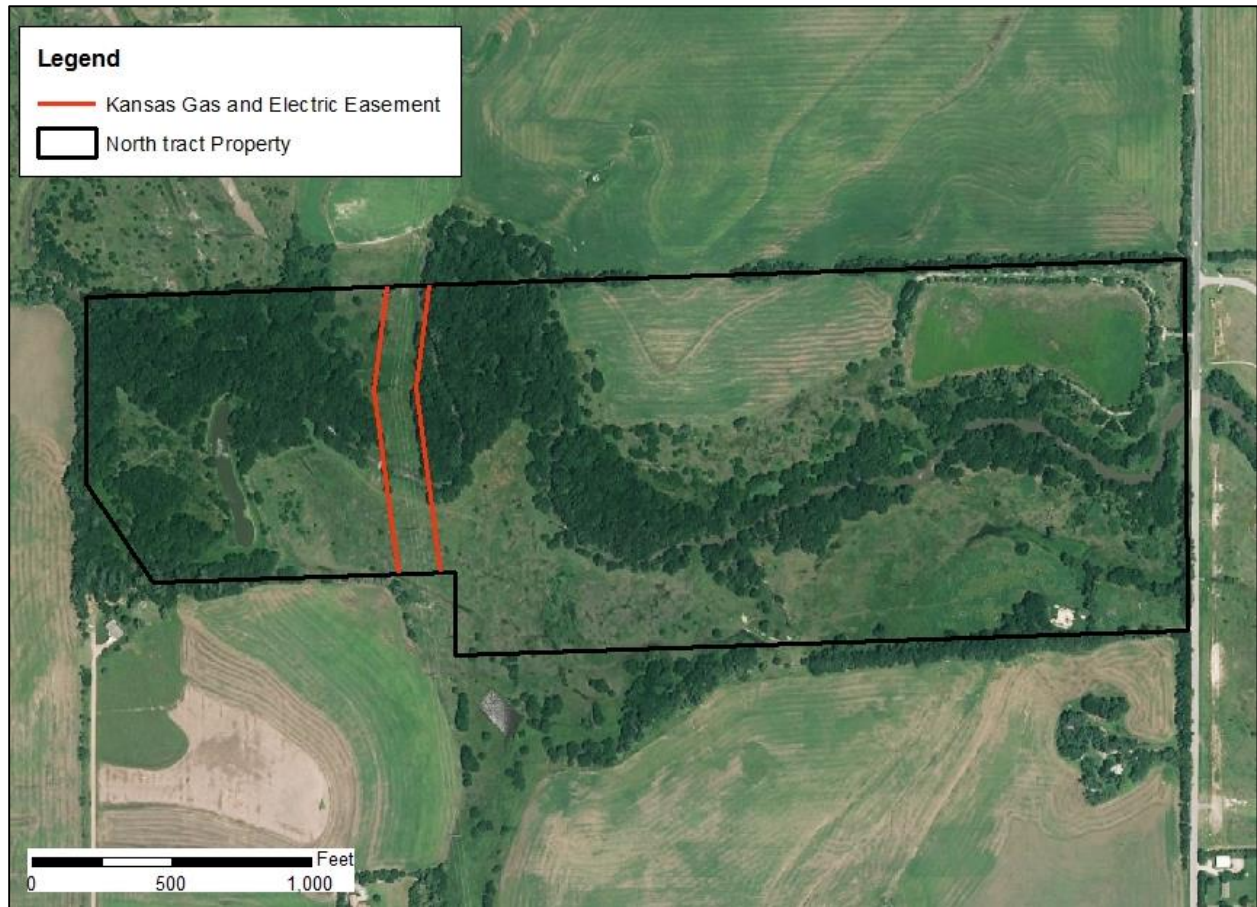


Figure 12: South Property Westar Energy, Inc. Easement



DETERMINATION OF CREDITS

WLT's wetland mitigation strategy is to restore 122.04-acres of temporarily flooded to seasonally flooded palustrine emergent wetland mosaics (PEMA and PEMC, respectively). Existing wetlands identified by NEC are degraded due to cultivation, levees limiting floodplain connectivity, and

invasion of undesirable woody plants (i.e. Osage orange and honey locust). For rehabilitated and reestablished wetlands, TWI determined wetland credits by land area and a restoration method of compensation where 1 wetland credit equals 1-acre gain in wetland area. WLT's rehabilitation and reestablishment activities will include converting cultivated lands to functional emergent wetlands, expanding micro-depressional features in wetland mosaic regions, removal of levees, removal of undesirable woody species, and plugging wetland drainage swales. For upland buffers, TWI determined wetland credits by land area and a buffer method of compensation where 1 wetland credit equals 4-acres gain in upland buffer area. WLT's proposed quantity of wetland credits are in Table 5.

Table 5: Proposed Wetland Credit Amounts

Mitigation Activity	Acres	Credit Ratio (Credits:Acres)	Wetland Credits
Wetland Reestablishment	20.12	1:1	20.12
Wetland Rehabilitation	100.34	1:1	100.34
Upland Buffer	28.16	1:4	7.04
Total Wetland Credits			127.50

Proposed wetland credits will offset wetland impacts from seven WLT ILF program Middle Arkansas Service Area projects. Table 6 lists the WLT ILF program projects and associated wetland credits. WLT proposes to apply the remaining 97.75-wetland credits to advance credits available for Middle Arkansas Service Area.

Table 6: WLT ILF Program Middle Arkansas Service Area Wetland Projects

Date of Sale	WLT ILF Project Name	USACE Permit	Wetland Credits	Cumulative Wetland Credits
5/31/2007	Horse Thief Reservoir	NWK-2006-1066	0.25	0.25
5/15/2009	Coleman Ventures/Terracon	-	0.30	0.55
12/15/2011	Kingman County	NWK-2010-01634	24.00	24.55
6/7/2012	Coulter Farms	NWK-2011-01476	1.60	26.15
8/30/2012	Slawson Companies - Cowskin Creek	NWK-2011-00390	0.21	26.36
1/29/2014	Sam's Club	NWK-2013-00321	0.73	27.09
5/13/2014	City of Wichita - Maize Road	NWK-2014-00124	2.66	29.75

WLT's objective is to fully offset the aquatic habitats (stream and wetland) lost from 10 WLT ILF program projects in the Middle Arkansas Service Area. Jurisdictional stream impacts from Horse Thief reservoir is one of these WLT ILF projects. USACE used linear feet to quantify Horse Thief Reservoir stream impacts, as the KSMG was not available in 2007. To convert linear feet to stream credits, TWI divided the ILF payment by WLT's cost per stream credit. There is approximately 42-percent of Horse Thief credits remaining, equating to 7,500 stream credits, after subtracting City of Oxford WLT ILF credits and anticipated Lake Barton WLT ILF credits.

WLT proposes to complete in-stream and riparian buffer restoration work within 15,920-feet of stream and 62.14-acres of riparian buffer. TWI's in-stream mitigation strategy includes removing large woody debris blockages, remove culvert crossings, remove a lowhead dam, construct a riffle grade control structure, expand floodplain connectivity, and stabilize streambanks using wood revetment structures. TWI's riparian buffer mitigation strategy is to remove undesirable woody vegetation. TWI has divided the project into seven reaches to apply towards the KSMG (see Figure 13 and Table 7).

Table 7: WLT ILF Cowskin Creek Project Reaches

Reach	Description
1	2,540-feet of Cowskin Creek in North Tract
2	3,650-feet of Cowskin Creek in North Tract
3	808-feet of unnamed Cowskin Creek tributary in North Tract
4	1,031-feet of Cowskin Creek in South Tract
5	6,393-feet of Cowskin Creek in South Tract
6	1,089-feet of Cowskin Creek in South Tract
7	409-feet of Cowskin Creek in South Tract

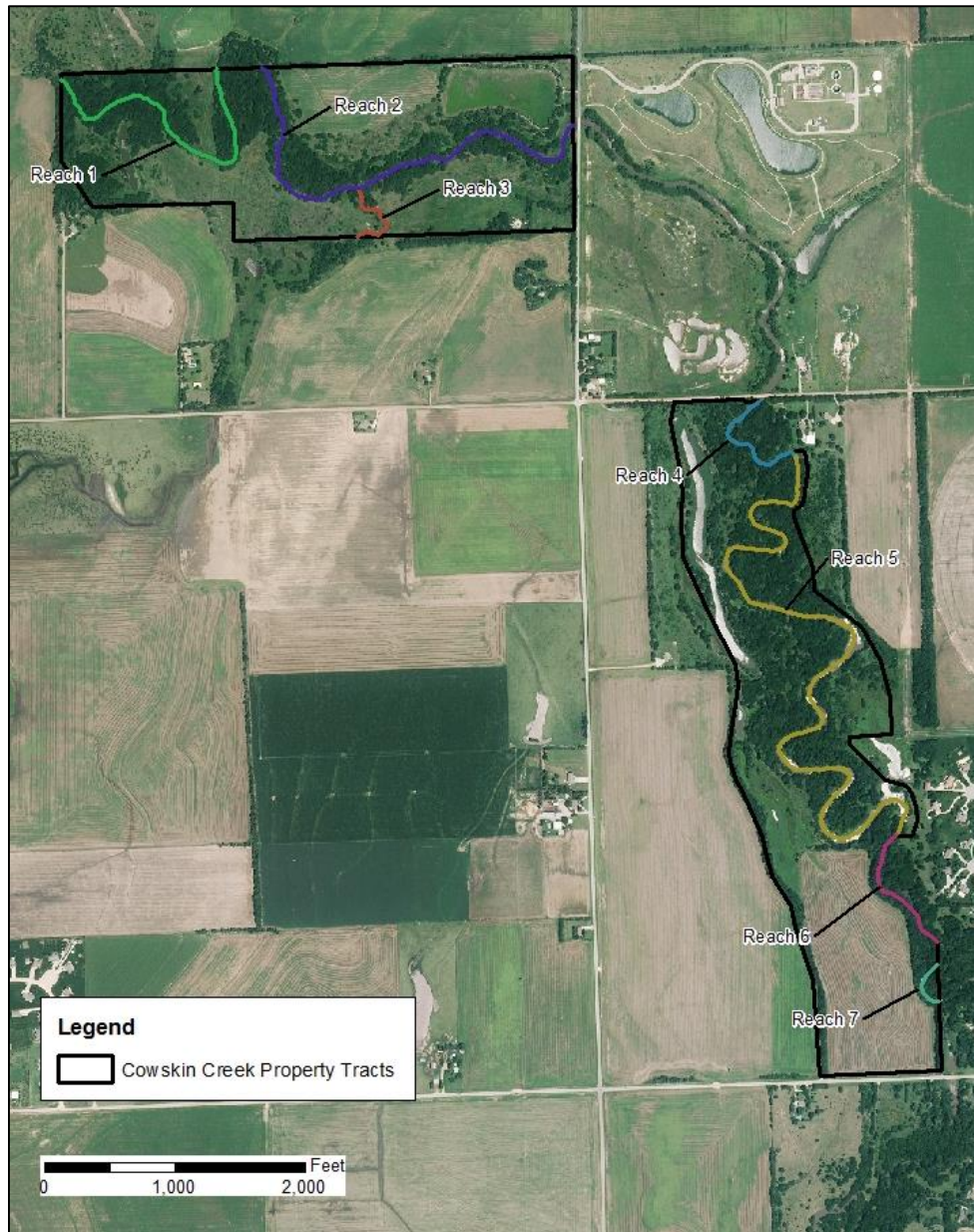
TWI considered the following information to calculate in-stream credits:

Stream Type

- Reach 1 – Cowskin creek is a perennial stream. TWI completed six cross sections and calculated an average bankfull width of 27.8-feet. TWI used the bankfull elevation as the ordinary high water mark (OHWM) translating to a stream type score of 0.6.

- Reach 2 – Cowskin Creek is a perennial stream. TWI completed seven cross sections and calculated an average bankfull width of 41.7-feet. TWI used the bankfull elevation as the OHWM translating to a stream type score of 0.8.
- Reach 3 – Unnamed Cowskin Creek tributary is an intermittent stream with pools. TWI assigned a stream type score of 0.4.
- Reach 4 and 5 – Cowskin Creek is a perennial stream. TWI completed twenty cross sections upstream of the lowhead dam and calculated an average OHWM of 66.9-feet. TWI considered the OHWM at the elevation of the lowest top of streambank and assigned a stream type score of 1.0.
- Reach 6 and 7 - Cowskin Creek is a perennial stream. These reaches are downstream of the lowhead dam and TWI completed one cross section survey. TWI used the bankfull elevation as the OHWM. At the bankfull elevation, the width is 27.6-feet, translating to a stream type score of 0.6.

Figure 13: Cowskin Creek Stream Mitigation Reaches



Priority Area

- Reach 1-7 – Cowskin Creek is a listed water on the 2014 303(d) list for E.coli, biology, total suspended solids, and total phosphorus impairments. The reaches are adjacent to a City of Wichita mitigation site and located within a high growth area. For these reasons, TWI assigned all reaches as a secondary priority area (score of 0.2).

Existing Condition

- Reach 1- Cowskin creek is listed on the Kansas 303(d) list and not highly functional. The reach has two impacts; culvert crossing and utility crossing. The reach is incised (bank height ratio greater than 1) with signs of both banks failing. TWI observed many trees that have eroded and are now in the active channel. For these reasons, TWI classified the reach as functionally impaired (score of 0.4).
- Reach 2 – Cowskin creek is impounded and TWI classified the reach as functionally impaired (score of 0.4).
- Reach 3 – Reach 3 has a perched culvert that impounds water and the left streambank has little riparian buffer that lacks the rooting depth to hold the streambank. TWI scored the reach as functionally impaired (score of 0.4).
- Reach 4 and 5 – These reaches are impounded and thus functionally impaired (score 0.4).
- Reach 6 and 7 – Reach 6 and 7 are incised and TWI observed bank failures on both banks. TWI rated the reach as functionally impaired (score 0.4).

Net Benefit

- Reach 1 – Reach 1 mitigation activities include removing a culvert, removing a levee that is within the 100-year floodplain, and removing large woody debris piles that constrict the flow and cause erosion cross current. TWI rated these activities as substantial (score of 3.5).
- Reach 2 – Reach 2 mitigation activities include removing a levee that is within the 100-year floodplain, removing large woody debris piles that are constricting the channel, and stabilization streambanks using wood revetment structures without the use of rock. TWI rated these activities as substantial (score of 3.5).
- Reach 3 – Reach 3 mitigation activities include removing a perched culvert and re-establishing the original flowline and creating a floodplain on the left bank. TWI rated these activities as substantial (score of 3.5).
- Reach 4 and 5 – Reach 4 and 5 mitigation activities involve removing a lowhead dam and replacing the structure with a rock riffle that will support aquatic organism passage. TWI

will also stabilize streambanks using wood revetments without rock and remove a berm within the 100-year floodplain. TWI rated these activities as substantial (score of 3.5).

- Reach 6 and 7 – Reach 6 and 7 activities will include removing a lowhead dam at the beginning of reach 6 and replacing the structure with a rock riffle that supports aquatic organism passage. TWI rated these activities as substantial (score of 3.5).

Control/Site Protection

- Reach 1-7 - TWI will record a conservation easement in Sedgwick County naming WLT as the grantee, a third party grantee. TWI scored this factor a 0.4 for all reaches.

Mitigation Construction Timing

- Reach 1-7 – WLT will complete less than 75-percent of the mitigation prior to and/or concurrent with the impacts. TWI scored this factor a 0.0 for all reaches.

Using the in-stream restoration of enhancement scores outlined above, TWI proposes to generate 84,730 total channel restoration/relocation credits (see Table 8).

Table 8: KSMG In-Stream Work/Channel Restoration or Enhancement and Relocation Worksheet

Factors	Reach 1	Reach 2	Reach 3	Reach 4	Reach 5	Reach 6	Reach 7
Stream Type	0.6	0.8	0.4	1.0	1.0	0.6	0.6
Priority Area	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Existing Condition	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Net Benefit	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Control/Site Protection	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Mitigation construction Timing	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sum Factors (M)	5.1	5.3	4.9	5.5	5.5	5.1	5.1
Stream length in Reach (LF)	2,540	3,650	808	1,031	6,393	1,089	409
Credits (C) = M x LF	12,954	19,345	3,959	5,671	35,162	5,554	2,086
Site Factor (SF) pg 19	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Additional Credits (A) pg 19							
Total Credits Generated (C x SF) + A =	12,954	19,345	3,959	5,671	35,162	5,554	2,086

Total Channel Restoration/Relocation Credits Generated = 84,730

TWI considered the following factors in determining KSMG riparian restoration credits.

Stream Type

- Reach 1-2, 4-7 – Cowskin creek is a perennial stream and TWI assigned a stream type score of 0.4.
- Reach 3 – Unnamed Cowskin Creek tributary is an intermittent stream with pools. TWI assigned a stream type score of 0.2.

Priority Status

- Reach 1-7 – Cowskin Creek is a listed water on the 2014 303(d) list for E.coli, biology, total suspended solids, and total phosphorus impairments. The reaches are adjacent to a City of Wichita mitigation site and located within a high growth area. For these reasons, TWI assigned all reaches as a secondary priority area (score of 0.2).

Net Benefit

- Reach 1 – WLT proposes riparian creation on both banks. The buffer area is 10.00-acres and the reach length is 2,540-feet. This equates to a 171.50-foot average buffer width. TWI assigned net benefit scores for streamside A and B of 0.40, corresponding to an average buffer width of 150-feet.
- Reach 2 - WLT proposes riparian creation on both banks. The buffer area is 17.18-acres and the reach length is 3,650-feet. This equates to a 205.03-foot average buffer width. TWI assigned net benefit scores for streamside A and B of 0.48, corresponding to an average buffer width of 200-feet.
- Reach 3 - WLT proposes riparian creation on both banks. The buffer area is 1.58-acres and the reach length is 808-feet. This equates to an 89.19-foot average buffer width. TWI assigned net benefit scores for streamside A and B of 0.24, corresponding to an average buffer width of 75-feet.
- Reach 4 - WLT proposes riparian creation on the west bank as the property line is centerline of Cowskin Creek. The buffer area is 1.96-acres and the reach length is 1,031-feet. This equates to an 82.81-foot average buffer width. TWI assigned a net benefit score for streamside A of 0.24, corresponding to an average buffer width of 75-feet.
- Reach 5 - WLT proposes riparian creation on both banks. The buffer area is 17.10-acres and the reach length is 6,393-feet. This equates to a 116.51-foot average buffer width. TWI assigned net benefit scores for streamside A and B of 0.32, corresponding to an average buffer width of 100-feet.
- Reach 6 - WLT proposes riparian creation on the west bank as the property line is centerline of Cowskin Creek. The buffer area is 1.84-acres and the reach length is 1,089-feet. This

equates to a 73.60-foot average buffer width. TWI assigned a net benefit score for streamside A of 0.16, corresponding to an average buffer width of 50-feet.

- Reach 7 - WLT proposes riparian creation on the west bank (streamside A) and riparian preservation on the east bank (streamside B). The west buffer area is 0.70-acres, the east buffer area is 0.37-feet and the reach length is 409-feet. This equates to a 74.55-foot average buffer width for streamside A and a 39.40-foot average buffer width for streamside B. TWI assigned net benefit scores for streamside A of 0.16 and B of 0.04, corresponding to an average buffer creation and preservation width of 50-feet.

Supplemental Buffer Credit

- Reach 1-3,5,7 – Since riparian buffer activities are proposed for both banks, TWI used to KSMG guidance and determined the supplemental credit by calculating the average net benefit for streamside A and B by reach. For reaches 4 and 6, TWI did not calculate supplemental credits as WLT proposes buffer activities on only one streamside.

Control/Site Protection

- Reach 1-7 - TWI will record a conservation easement in Sedgwick County naming WLT as the grantee, a third party grantee. TWI scored this factor a 0.2 for all reaches.

Mitigation Construction Timing

- Reach 1-7 - WLT will complete less than 75-percent of the mitigation prior to and/or concurrent with the impacts. TWI scored this factor a 0.0 for all reaches.

Temporal Lag

- Reach 1-7 – WLT’s proposed activities is to remove non-native and undesirable woody vegetation from riparian buffers and promote an open, herbaceous riparian buffer. TWI scored this factor 0.0, a temporal lag of less than 5 years.

Using the riparian buffer scores outlined above, TWI proposes to generate 28,021 total riparian restoration credits (see Table 9).

Table 9: Proposed KSMG Riparian Buffer Credits

Factors	Reach 1	Reach 2	Reach 3	Reach 4	Reach 5	Reach 6	Reach 7
Stream Type	0.4	0.4	0.05	0.4	0.4	0.4	0.4
Priority Status	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Net Benefit (stream side A)	0.40	0.48	0.24	0.24	0.32	0.16	0.16
Net Benefit (stream side B)	0.40	0.48	0.24	0.00	0.32	0.00	0.04
Supplemental Buffer Credit	0.40	0.48	0.24	0.00	0.32	0.00	0.10
Control / Site Protection	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Mit. Construction Timing (side A)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mit. Construction Timing (side B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temporal Lag (years)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sum Factors (M) =	2	2.24	1.17	1.04	1.76	0.96	1.1
Linear Feet of Stream buffer (LF)	2,540	3,650	808	1,031	6,393	1,089	409
Credits (C) = M x LF	5,080	8,176	945	1,072	11,252	1,045	450
Site Factor (SF) pg.19	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Total Credits Generated C x (SF)	5,080	8,176	945	1,072	11,252	1,045	450

Total Riparian Restoration Credits generated = 28,021

In-stream and riparian credits total 112,751 stream credits. Proposed stream credits will offset stream impacts from four WLT ILF program Middle Arkansas Service Area projects. Table 10 lists the WLT ILF program projects and associated stream credits. WLT proposes to apply the remaining 94,121-stream credits to advance credits available for Middle Arkansas Service Area.

Table 10: WLT ILF Program Middle Arkansas Service Area Stream Projects

Date of Sale	WLT ILF Project Name	USACE Permit	Stream Credits	Cumulative Stream Credits
5/31/2007	Horse Thief Reservoir	NWK-2006-1066	7,500.00	7,500.00
7/12/2010	City of Wichita	NWK-2009-00775	2,211.00	9,711.00
12/15/2011	Kingman County	NWK-2010-01634	3,419.00	13,130.00
5/29/2013	Koch Industries	NWK-2012-01428	5,500.00	18,630.00

Upon approval by USACE, in consultation with the Kanas IRT, the generated credits will become available for use by WLT in accordance with the following schedule. Since areas in the mitigation property are different ecological habitats, performance milestones may occur at different times. As a result, the Sponsor may request the release of wetland credits and stream credits together or separately.

1. 20-percent of the total number of projected wetland and stream credits shall be available to satisfy the aforementioned Middle Arkansas Service Area projects when: (1) USACE approves the mitigation plan; (2) WLT's financial assurances have been appropriately established and funded; and (3) WLT records the conservation easement with Sedgwick County, Kansas.
2. 30-percent of the total number of the generated wetland and stream credits shall become available to satisfy the aforementioned Middle Arkansas Service Area projects when construction and plantings are complete and WLT submits an As-Built report USACE approves in consultation with the Kansas IRT. WLT anticipates mitigation activities to occur in stages, and WLT will supply completion reports as construction finishes for each stage (i.e. tree removal per mitigation region). WLT proposes credit releases within this milestone be commensurate with completion of each stage. TWI will submit required local, state, and federal permit applications and receive permit approval prior to construction.
3. 30-percent of the total number of generated wetland and stream credits shall become available to satisfy the aforementioned Middle Arkansas Service Area projects when WLT satisfies wetland, upland buffer, and in-stream performance standards. WLT requests USACE in consultation with the Kansas IRT release a total not to exceed 10 percent of the generated wetland and stream credits submittal of annual monitoring reports demonstrating WLT is satisfying in-stream, buffer, and wetland performance standards.
4. The remaining 20-percent of generated wetland and stream credits shall become available to satisfy the aforementioned Middle Arkansas Service Area projects when USACE, in consultation with the Kansas IRT, approves all performance standards.

USACE, in consultation with the Kansas IRT, shall release credits to WLT following the proposed credit release schedule. WLT will submit documentation to USACE to support completed performance milestones. USACE will supply WLT's documentation to the Kansas IRT. The Kansas IRT must provide comments to USACE within 15 days of receipt of documentation. USACE will schedule a site visit with Kansas IRT members as soon as possible to assess performance milestones. After USACE has received comments from Kansas IRT members, USACE will accept or reject the performance milestones. USACE shall make this determination within 30 days of the end of the comment period and shall notify WLT and the Kansas IRT of their decision.

USACE, in consultation with the Kansas IRT, may modify the credit release schedule, adjust the number of available credits, or suspend credit sales or transfers if USACE determines there are deficiencies in the ecological performance standards or mitigation plan requirements.

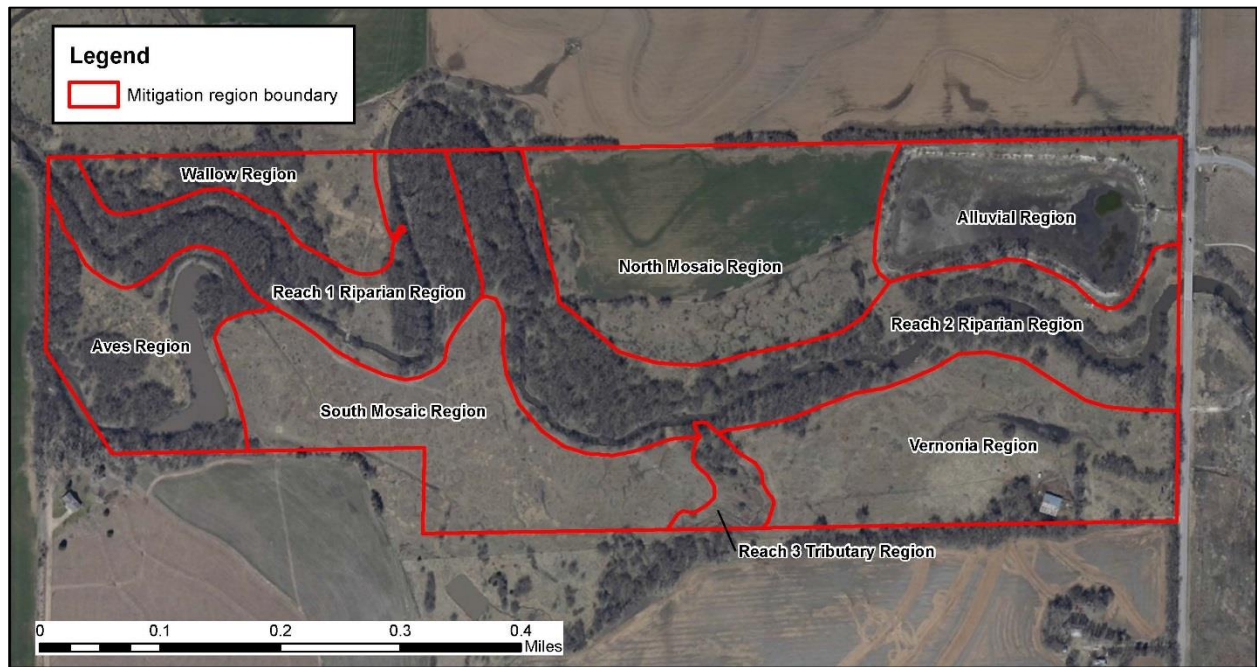
MITIGATION WORK PLAN

WLT will complete mitigation activities in phases. To organize a phased mitigation activity approach, WLT has divided the North and South Tract into regions (see figure 14 and 15). For the North Tract, WLT has prioritized mitigation activities in the following order:

1. Levee and woody vegetation removal in Alluvial Region.
2. Woody vegetation removal, wetland hydrology rehabilitation, and upland buffer restoration in North Mosaic Region.
3. Woody vegetation removal and wetland hydrology rehabilitation, and wetland rehabilitation in South Mosaic Region.
4. Cowskin Creek large woody debris removal, woody vegetation removal, and streambank stabilization in Reach 2 Riparian Region.
5. Woody vegetation removal and wetland hydrology rehabilitation in Vernonia Region.
6. Levee and woody vegetation removal in Aves Region.
7. Woody vegetation removal and wetland hydrology rehabilitation in Wallow Region.
8. Woody vegetation, Cowskin Creek large woody debris, and culvert crossing removal in Reach 1 Riparian Region.

9. Floodplain restoration, woody vegetation removal, and culvert removal in Tributary Region.

Figure 14: WLT ILF Program North Tract Mitigation Regions



For the South Tract, WLT has prioritized mitigation activities in the following order.

1. Re-establishment of farmed wetland and upland buffer in Novo Region
2. Levee removal that will reconnect Cowskin Creek floodplain in Heron, Reach 4 Riparian, and Palustrine Regions.
3. Palustrine emergent wetland rehabilitation by woody vegetation removal. This activity includes all regions and WLT will complete removal by region. Large woody debris within Cowskin Creek will also occur in Reach 4 Riparian Region.
4. Rock riffle construction and streambank stabilization in Reach 4 Riparian Region
5. Lowhead dam removal in Reach 4 Riparian Region.

In Appendix A, WLT provides a set of preliminary design drawings that show grading plans for wetland reestablishment and rehabilitation areas, locations and specifications for wood revetment structures, locations and specifications for rock riffle and stream crossing structures, and locations for large woody debris removal.

Figure 15: WLT ILF Program South Tract Mitigation Regions

WLT's mitigation strategy is also to remove nonnative and undesirable woody vegetation and re-establish historical vegetation communities within riparian and floodplain areas. WLT's removal priority will be Osage orange and Honey locust. WLT will follow NRCS brush management (conservation practice 314) guidelines (NRCS 2007, 2013a, and 2013b). NRCS (2013b) considers Osage orange and honey locust infestation low when less than 5-percent canopy cover and high when over 15-percent canopy cover. Using aerial photograph, TWI will estimate canopy cover for each region (see Table 11) with an overall canopy cover of 42.58-percent. Tree removal, specifically for Osage orange, will not include uprooting or excavation (if possible) as to not cause additional regrowth from broken roots. WLT's contractor will cut trees near ground surface and

apply a Triclopyr herbicide mix to the stump immediately after cutting to comply with accepted cut stump applications (Thompson et al. 2015). WLT will have the contractor construct brush piles resulting from removal of woody infestations and burn when conditions and regulations allow. TWI will instruct contractors to save the following species: buttonbush (*Cephalanthus occidentalis*), black willow (*Salix Nigra*), sandbar willow (*Salix exigua*), and American elm (*Ulmus americana*).

Table 11: Canopy Cover per Mitigation Region

Mitigation Region	Area*	Canopy Area*	Percent Canopy Cover
North Tract			
Alluvial	11.04	2.59	23.46
Aves	9.25	5.84	63.14
North Mosaic	18.46	2.02	10.94
Reach 1 Riparian	11.99	9.85	82.15
Reach 2 Riparian	21.16	15.79	74.62
Reach 3 Tributary	1.81	0.47	25.97
South Mosaic	15.09	0.61	4.04
Vernonia	15.58	1.71	10.98
Wallow	5.53	3.11	56.24
South Tract			
Backwater	7.15	3.17	44.34
Deciduous	6.38	4.17	65.36
Novo	32.44	3.12	9.62
Palustrine	10.8	3.24	30.00
Reach 4	35.67	24.5	68.69
Riverbend	3.51	3.17	90.31
Swale	9.72	8.43	86.73
Entire Mitigation Area	215.58	91.79	42.58

* Acres

Removal of the canopy will in turn allow sunlight to reach ground surfaces, promoting native prairie vegetation over existing shade-dependent species. Riparian areas where WLT will remove undesired vegetation, WLT will plant native prairie species, with scattered with willow (*Salix spp.*) and Eastern cottonwood (*Populus deltoides*). WLT will remove other non-native, invasive species (i.e. Johnsongrass) using herbicidal application in affected areas.

Floodplain hydrology restoration will be the second component of the mitigation work plan. WLT will remove levees promoting floodplain access during high flow events. Improved floodplain access will dissipate high flow velocities, increase wetland hydrology, and improve water quality by natural filtration. In addition, WLT will also grade several drainage gullies to slow water draining from wetlands. For the North Tract tributary, WLT is planning to restore the floodplain on both banks and to remove a culvert crossing that will reconnect the tributary floodplain.

The mitigation work plan will also include in-channel enhancements for Cowskin Creek. Removal of large woody and other foreign debris will coincide with streambank stabilization that TWI has identified for both the North and South Tracts. TWI has identified several in-stream structures for removal that include a low water crossing on the North Tract and the lowhead dam on the South tract. TWI has designed a rock riffle letdown structure and rock riffle crossing to drop the water elevation in a stable form and promote aquatic organism passage.

Lastly, the mitigation work plan will include the re-establishment of upland prairie to approximately 28-acres of previously grazed and/or cultivated land. WLT will seed only native mixed-grass and forb species (see Table 12). WLT will use a no-till grass drill to plant the grass/forb seed mixture.

Table 12: Proposed Native Grass and Forb Seed Mixture

Species	Variety	PLS (lbs/acre)	Percent of Mix	PLS (lbs/acre)	Acres	Total PLS (lbs)
Grasses						
Big Bluestem	Kaw	6.0	30	1.80	28.2	50.76
Little Bluestem	Alsous	4.0	25	1.00	28.2	28.20
Indiangrass	Cheyenne	6.0	15	0.90	28.2	25.38
Switchgrass	Blackwell	3.0	20	0.60	28.2	16.92
Sideoats grama	El Reno	6.0	10	0.60	28.2	16.92
Forbs						
Black Eyed Susan				0.01	28.2	0.28
Clasping Coneflower				0.01	28.2	0.28
Greyhead Coneflower				0.04	28.2	1.13
Upright Coneflower				0.02	28.2	0.56
Plains Coreopsis				0.01	28.2	0.28
Illinois Bundleflower				0.30	28.2	8.46
Indian Blanket				0.16	28.2	4.51
Showy Partridgepea				0.10	28.2	2.82
Purple Prairie Clover				0.34	28.2	9.59
Maximillian Sunflower				0.05	28.2	1.41

OPERATION AND MAINTENANCE PLAN

WLT agrees to complete all necessary work to ensure the Cowskin Creek ILF project achieves performance standards. Operation and maintenance work may include, but not limited to, replanting vegetation, removal of invasive species, mowing, repairing or replacement of rock riffles and/or wood revetment structures, removal of large woody debris jams, and prescribed burning. WLT will consult with USACE, IRT, and other natural resources professionals throughout the operation and maintenance period to ensure best management practices. TWI will determine maintenance requirements during a minimum of three site visits per year.

For operation and maintenance during the upland grass/forb buffer-planting establishment, the following activities will occur. In May/June, TWI will inspect the seeded areas for excessive weed

growth. If excessive weed growth is present, then TWI will use either herbicide applications or mowing to control the weed growth.

TWI will apply Transline or equivalent on the weeds when they reach a height of 6 to 12 inches. If TWI finds excessive weed growth consistently in the seeded area, TWI will mow the area when the weeds reach a height of 6 to 12 inches. TWI will not mow on days when the maximum air temperature exceeds 95 degrees and the humidity is below 30 percent to avoid dehydration of the seeded plants (USDA NRCS 2011). TWI will not mow later than July 15 except during years of abnormal high moisture that may promote excess weed production (USDA NRCS 2011).

For reestablished and rehabilitated wetlands, TWI will inspect and evaluate wetlands regularly for invasive species. TWI will manage invasive species encroachment to maximize wetland diversity and function. Table 13 lists the invasive species TWI will manage. TWI will use a variety of methods to remove invasive species that include physical removal, trimming, chemical spraying, and seedhead removal. For chemical applications, TWI will use herbicides approved for use in and near aquatic environments and TWI will follow applied herbicide directions and safety precautions. TWI has the ability to apply chemical herbicides by spot spraying and broadcasting herbicides using Gator mounted tank and spray boom.

Table 13: Targeted Noxious or Invasive Vegetative Species

Scientific Name	Common Name
<i>Cirsium vulgare</i> *	Bull Thistle
<i>Ambrosia grayii</i> *	Bur Ragweed
<i>Cirsium arvense</i> *	Canada Thistle
<i>Convolvulus arvensis</i> *	Field Bindweed
<i>Cardaria draba</i> *	Hoary Cress
<i>Sorghum halepense</i> *	Johnsongrass
<i>Pueraria lobate</i> *	Kudzu
<i>Euphorbia esula</i> *	Leafy Spurge
<i>Rosa multiflora</i> *	Multiflora Rose
<i>Carduus nutans</i> *	Musk Thistle
<i>Hoffmannseggia densiflora</i> *	Pignut
<i>Agropyron repens</i> *	Quackgrass
<i>Acroptilon repens</i> *	Russian Knapweed
<i>Lespedeza cuneate</i> *	Sericea Lespedeza
<i>Tamarisk spp</i>	Salt Cedar
<i>Lythrum salicaria</i>	Purple Loosestrife
<i>Phalaris arundinacea</i>	Reed Canarygrass
<i>Centaurea solstitialis</i>	Yellow Starthistle
<i>Hydrilla verticillata</i>	Hydrilla
<i>Cynanchum louiseae</i>	Black Swallow-Wort
<i>Euonymus fortunei</i>	Winter creeper
<i>Maclura promifera</i>	Osage orange
<i>Morus alba</i>	White mulberry
<i>Umla pumila</i>	Siberian elm
<i>Bromus spp</i>	Brome species
<i>Conium maculatum</i>	Poison hemlock
<i>Cynodon dactylon</i>	Bermudagrass
<i>Digitaria spp</i>	Crabgrass
<i>Poa pratensis</i>	Kentucky bluegrass
<i>Rumex spp</i>	Dock species
<i>Schedonorus spp</i>	Fescue species

*Species are on the official Kansas Department of Agriculture Weed Control Program Noxious Weeds list.

TWI will monitor rock riffle structures, wood revetment structures, and graded wetland areas to verify as-built design elevations and slopes. TWI has established control points in both property

tracts and can verify/check elevations using a total station. TWI will also inspect rock and wood structures for buildup of debris and sediment and structure degradation. Management options TWI will use will include debris and sediment removal, rock and wood replacement, and adding additional rock to account for structure settlement. TWI has control of the north tract water right and TWI will maintain the water right by exercising it to inundate nearby floodplains on the North Tract. TWI's wetland reestablishment and rehabilitation design will not be dependent on the water right to achieve functional lift.

PERFORMANCE STANDARDS

Proposed mitigation activities will enhance and restore lost ecological functions. Through improvement of riparian and wetland buffers, excess amounts of sediment, nutrients, and pesticides from surrounding agricultural landscapes will be reduced in the surface water runoff into Cowskin Creek. The buffers will also reduce the amounts of the aforementioned detriments entering the shallow groundwater flow within the local alluvial aquifer. Improvements TWI proposes to these buffers include the removal of large woody vegetative encroachment along Cowskin Creek and enhancement of native species coverage. Additionally, mitigation activities will improve in-stream features through removal of large woody debris jams, bank stabilization in areas prone to excessive sedimentation, removal of a low-head dam, and removal of 2 culvert crossings. These enhancements will generate a diversity of habitat availability and allow aquatic organisms to move through Cowskin Creek. For reestablishment and rehabilitation of wetlands regions, TWI will remove woody vegetation, excavate micro and macro depressions to reestablish or expand existing wetland mosaics, and reconnection Cowskin Creek to more floodplain by removing levees. The following performance standards outline mitigation goals, based upon baseline data.

Upland Buffer Creation

Using the Kansas Agronomy Technical Note KS-27 (USDA NRCS 1998) for Assessing Stand Density, TWI will assess the stand density of planted grass/forb upland buffers. An acceptable stand will be with an average stand count of 2 or more planted seedlings per frame.

Performance Standards

1. Grass/forb riparian buffer will maintain a stand density score of 2 or higher.
2. Noxious weeds and invasive species (see Table 13) will comprise no more than 5% of the absolute cover of the wooded riparian and grass/forb buffer.

Wetland Re-establishment and Rehabilitation

WLT's mitigation strategy will reestablish/rehabilitate 120.46 acres of floodplain wetlands. Proposed wetland will be palustrine emergent with temporarily of seasonally flooded hydrology regimes.

Performance Standards

1. Wetlands will show seasonal evidence of wetland hydrology criteria based on the 1987 Corps of Engineers Wetland Delineation Manual (Environmental Laboratory 1987) and the Great Plains Region supplement within five years of completion of mitigation activities.
2. Wetlands will meet the hydric vegetation criteria in the 1987 Corp of Engineers Wetland Delineation Manual and the Great Plains Regional supplement. Additionally, wetlands will meet the Kansas FQA mean wetland indicator coefficient indicative of a hydrophytic dominant community (-1.21), and will be comprised of at least 80 percent native herbaceous species within five years of completion of mitigation activities.
3. Evidence of wetland hydrology will be used as the performance standard to show appropriate development of hydric soils at re-established and rehabilitated wetlands as it may take an unknown period of time before certain hydric soil indicators become observable.
4. Wetlands at the site will score and maintain a Category 2 rating (within 45 – 64.9) using the *ORAM version 5.0* quantitative scoring.

In-Stream Physical Habitat Features

The riffles structures will provide stable in-channel features diversifying habitat conditions in the mitigation reaches by slowing streambank erosion and providing aquatic organism passage. Proposed performance standards shall be monitored over a 5-year period post construction,

Performance Standards

1. Constructed riffles will maintain a minimum slope of 20:1.
2. Constructed riffle will maintain as-built flow line elevation.
3. Removed culvert crossing and low-head dam shall be free of lateral and downward cutting
4. Wood revetment structures shall be free of excessive limb damage. The structures shall be able to slow water velocities in near bank region.

MONITORING REQUIREMENTS

WLT will monitor WLT ILF program mitigation activities for five consecutive years post-construction to assess performance standards and determine if maintenance or adaptive management are required. Further monitoring may be extended or waived by the USACE based upon whether or not performance standards are met. USACE, through coordination with the IRT, maintains the authority to modify, extend or waive monitoring requirements. WLT will submit to USACE and Kansas IRT an annual monitoring report that includes information described in this section.

Rock Riffle and Wood Revetment Structures

On an annual basis, TWI will inspect the general characteristics of the rock riffle, rock check dam, and wood revetment structures, and the condition of each structure. TWI will complete monitoring during base flow conditions when the structures are the most visible and accessible. General characteristic measurements will include rock structure slope and flow line elevation. TWI will also inspect for rock degradation and quality of wood in the revetment structures. TWI will establish photopoints at each structure to document annual conditions.

Riparian Buffer Creation

On an annual basis, TWI will inspect the seeded native grass/forb upland buffers. Since it normally takes three years to establish the vegetation, the first three years will be devoted to operation and maintenance activities. At the end of the third growing season for the native grass/forb area, TWI will perform a stand density assessment. TWI will count a minimum of 10 random samples per 10 acres to collect a representative sample of conditions. TWI will determine latitude/longitude sample locations prior to arriving on-site. For each sample, TWI will count plants within a 24-inch by 11.5-inch clipping frame. TWI will record the counts in a stand evaluation worksheet that is included in Appendix H. An acceptable stand will be an average stand count of 2 or more planted seedlings per frame. The Kansas Agronomy Technical Note KS-27 (USDA NRCS 1998) for assessing stand density states that at an average of two or more planted seedlings per frame should allow for natural recruitment in the following seasons allowing for a successful planting. For average stand counts that fall between 1- and 2-planted seedlings, TWI will solicit professional judgment from a USDA NRCS range specialist to determine if reseeding is necessary. If stand counts average less than 1-planted seedling per frame, then reseeding will be required (USDA NRCS 1998). For any reseeded area, TWI will perform operation and maintenance activities for three years as outlined in the operation and maintenance plan.

Wetland Reestablishment and Rehabilitation

TWI will use a modified monitoring protocol based on Section E of Environmental Laboratory (1987) manual to monitor the created and enhanced wetlands. TWI will establish permanent sampling transects through each wetland region. On a yearly basis, TWI will establish random sampling locations along these transects. TWI will sample a minimum of three random locations along each transect to evaluate native species percent cover and mean wetland indicator status of the community. In addition, TWI will establish photo points prior to construction and will use them to document wetlands conditions. TWI will monitor wetland hydrology and vegetation for five years. TWI will complete hydrology monitoring along the sampling transects, to be conducted between April and June and be sufficient to show wetland hydrology for at least 11 consecutive days.

LONG TERM MANAGEMENT PLAN

WLT will be responsible for long-term management. WLT's conservation easement will be held in perpetuity and shall preserve the property.

WLT will carry out maintenance of the mitigation property for a minimum of ten years following approval of all performance standards. After the ten years, WLT will consider all ecosystems self-sustainable. Long-term maintenance needs will likely be supplemental hydrological inputs, vegetation management, in-channel structure maintenance, removal of trash, and property inspections to ensure that no activities occur that are inconsistent with the purpose of the conservation easement. WLT will complete annual inspections that will identify maintenance needs. Likely vegetation maintenance activities will be eradication of invasive species and reseedling of bare spots with native vegetation. The rock riffle structures are designed for long-term success, but are susceptible to damage from floods and rock degradation. WLT will use TWI staff to assess whether any damages/changes to the rock riffle structures require corrective actions. TWI will inundate nearby reestablished/rehabilitated wetlands, to maintain the property's water rights with the goal of conserving as much of the water right as possible. A schedule of maintenance activities and estimated costs are in Table 14.

Table 14: Long-Term Maintenance Schedule (Based on 2015 Prices)

Maintenance Item	Requirement	Acres	Percent of Area	Cost per Unit	Schedule	Yearly Cost
Site Inspection	1 Visit	228.0	100	\$5.75	Yearly	\$1,311.00
Buffer Reseeding	7 # PLS / acre	28.16	5	\$996.97	Yearly	\$1,363.43
Invasive Species Removal	1 Visit	228.0	1	\$710.07	Yearly	\$1,598.43
In-Stream Structure Maintenance	1 visit	N/A	1 (Rock)	\$3,330.25	Every 5 Years	\$666.05
Trash removal	1 Visit	N/A	N/A	\$710.45	Yearly	\$710.45
Miscellaneous	1 Visit	N/A	N/A	\$710.45	Yearly	\$710.45
Yearly Total						\$6,359.81

WLT agrees to provide the following financial assurances for work associated with this mitigation project. WLT has paid a sum of \$20,000 U.S. Dollars as a stewardship fee to ensure compliance, monitoring, and legal defense in perpetuity with the conservation easement.

ADAPTIVE MANAGEMENT PLAN

If the project cannot be constructed as designed, WLT will notify USACE. Significant modifications to the original design will require USACE approval, in consultation with the IRT, prior to construction. Active input from the IRT is welcome and encouraged. WLT will use an adaptive management approach to deal with unforeseen issues. WLT is prepared to complete activities that are necessary as appropriate for the long-term management. Unforeseen activities may include planting alternate, but desirable upland buffer species, planting wetland species, and replacing wood revetment structures with rock.

If unforeseen circumstances arise so that the mitigation project cannot meet performance standards, then WLT will approach USACE with suggestions or changes that are commensurate toward meeting mitigation objectives. If necessary, performance standards may require revising. Any revisions will be commensurate or superior to original performance standards.

FINANCIAL ASSURANCES

Once the final construction costs have been determined and any adaptive management initiated, WLT will deposit a security fee for the costs necessary to replace 5 percent of the tree removal, mitigation activities for the balance of the establishment period. WLT considers tree removal a low-risk portion of the project and not a susceptible to failure. WLT will deposit a security fee for the costs necessary to replace 10 percent of the wetland grading, upland buffer creation and rock/wood structures for the balance of the establishment period. These mitigation activities have a higher risk of failure or repair. WLT did not factor a deposit for additional land costs since USACE and IRT determined the site has good mitigation potential. WLT will refund the security fee to the Kansas Aquatic Resources Trust Fund (KARTF) at the end of the establishment period, if any.

REFERENCES

- Dahl, T.E. 2014. Status and trends of prairie wetlands in the United States 1997 to 2009. U.S. Department of the Interior; Fish and Wildlife Service, Ecological Services, Washington, D.C.
- Environmental Laboratory. (1987). *Corps of Engineers Wetlands Delineation Manual*. Technical Report Y-87-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS (<http://www.wes.army.mil/el/wetlands/pdfs/wlman87.pdf>).
- Freeman, C.C. 2014. Coefficients of Conservatism for Kansas Vascular Plants and Selected Life History Attributes. Kansas Biological Survey R.L. McGregor Herbarium, University of Kansas.
- Kansas Center for Agriculture Resources and Environment & Kansas State University Research and Extension. 2011. Little Arkansas River Watershed Restoration and Protection Strategy. On-line address: http://www.kswraps.org/files/attachments/littlearkansas_plansummary.pdf
- Kansas Department of Health and Environment (KDHE).
- 2000a. Lower Arkansas River Basin Total Maximum Daily Load: Fecal Coliform Bacteria. August 9.
- 2000b. Lower Arkansas River Basin Total Maximum Daily Load; Water Body: Cowskin Creek; Water Quality Impairment: Fecal Coliform Bacteria. August 9.
2007. Lower Arkansas River Basin Total Maximum Daily Load; Water Body: Cowskin Creek; Water Quality Impairment: Biological Nutrient Impairment bundled with pH. June 29.
2014. 2014 303(d) List of All Impaired/Potentially Impaired Waters. March 25. On-line address: http://www.kdheks.gov/tmdl/2014/2014_303_d_Long.pdf.
- Kansas Department of Health and Environment & U.S. Department of Agriculture Natural Resources Conservation Service (KDHE & NRCS). 1998. Kansas Unified Watershed Assessment FFY 1999. On-line address: <http://www.kdheks.gov/nps/resources/uwa.pdf>.
- Kansas Department of Wildlife, Parks, and Tourism (KDWPT).
2006. Stream Monitoring and Assessment Program Sub-Watershed Report. February. On-line address: <http://kdwpt.state.ks.us/news/Services/Stream-Assessment-and-Monitoring-Program>.
2014. Spotted Skunk Species Description. On-line address: <http://kdwpt.state.ks.us/news/layout/set/print/Services/Threatened-and-Endangered-Wildlife/All-Threatened-and-Endangered-Species/EASTERN-SPOTTED-SKUNK>
- Mack, J.J. 2001. Ohio Rapid Assessment Method for Wetlands Manual, Version 5. Ohio EPA Technical Bulletin Wetland/2001-1-1. Ohio Environmental Protection Agency, Division of Surface Water, 401 Wetland Ecology Unit, Columbus, Ohio.
- Mulder, K., S. Blackford, B. Simmons, & P. Liechti. 2010. Kansas Stream Mitigation Guidance (KSMG), Version 2. Department of the Army, Kansas City District Regulatory Office in

- consultation with Technical Working Committee. June 25. On-line address: http://www.nwk.usace.army.mil/Portals/29/docs/regulatory/mitigation/KSMG_Guidance_25Jun2010.pdf.
- Nilz, S.K., and E.J. Finck. 2008. Proposed recovery plan for the eastern spotted skunk (*Spilogale putorius*) in Kansas. Kansas Department of Wildlife and Parks, Pratt, KS.
- River City WRAPS. 2012. Lower Arkansas/River City Basin Watershed Restoration and Protection Plan. On-line address: http://www.kswraps.org/files/attachments/lowerark_plansummary_0.pdf.
- Samson, F. and F. Knopf. 1994. Prairie Conservation in North America. *BioScience*, Vol. 44, No. 6. June. Pp: 418-421.
- United States Department of Agriculture Natural Resources Conservation Service (NRCS).
2007. Kansas Technical Note KS-8. ECS-Range-Brush Management.
2008. Ecological Site Characteristics: Sodic Claypan (PE 21-28). March 7. On-line address: <https://esis.sc.egov.usda.gov/Welcome/pgApprovedSelect.aspx?type=ESD>
- 2013a Brush Management Conservation Practice Standard.
- 2013b Brush Management Construction Specifications.
2014. Soil Survey of Sedgwick County, Kansas. Accessed on August 4, 2014. On-line address: <http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>.
- United States Army Corp of Engineers (USACE).
- 2010a. *In-Lieu Fee Program Instrument Outline for Proposed In-Lieu Fee Programs in the States of Kansas and Missouri*. February. Accessed on-line at: <http://www.nwk.usace.army.mil/regulatory/CompMit/compmit.htm>.
- 2010b. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region (version 2.0)*, ed J.S. Wakely, R.W. Lichvar, and C.V. Noble. ERDC?EL TR-10-1. Vicksburg, MS: U.S. Army Engineer Research and Development Center.
- United States Fish & Wildlife Service. 2014. National Wetlands Inventory (USFWS). Accessed on October 18, 2014.
- United States Geological Survey (USGS). 1982a. Colwich, Kansas, 7.5-minute Series Topographic Quadrangle Map.
- United States Geological Survey (USGS). 1982b. Maize, Kansas, 7.5-minute Series Topographic Quadrangle Map.
- United States Geological Survey (USGS). 1982c. W, Kansas, 7.5-minute Series Topographic Quadrangle Map.
- Wasson, T., L. Yasui, K. Brunson, S. Amend, V. Eber. October 2005. *A Future for Kansas Wildlife, Kansas' Comprehensive Wildlife Conservation Strategy*. Dynamic Solutions, Inc. in cooperation with Kansas Department of Wildlife and Parks.
- Watershed Land Trust, Inc, (WLT). 2013. Aquatic Resource Mitigation In-Lieu Fee Program Instrument: State of Kansas. July 17.

APPENDIX A

STREAM AND WETLAND PRELIMINARY DESIGN DRAWINGS

APPENDIX B

***NORMAN ECOLOGICAL CONSULTING WETLAND AND PLANT COMMUNITY
REPORT***

APPENDIX C

ORAM WORKSHEETS

APPENDIX D

GEOMORPHOLOGY REPORT
